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American, British and Japanese Proposals at the Geneva Conference and Their Bearing on Competitive Navy Building

MEN in political life rather than industrial leaders have been heard from in public expressions concerning the failure of the disarmament conference at Geneva. But American industry is vitally interested in the effects of that disagreement as they may develop in the four years that will elapse before the reconvening of the Washington conference of 1921.

What the Coolidge administration hoped for was that Great Britain and Japan would consent to apply the 5:5:3 ratio fixed at Washington for battleships to the limitation of cruisers, submarines, etc., with tonnage restricted for economy's sake. But the conference showed plainly that while all three powers apparently accept the mandate of economy in principle, neither Great Britain nor Japan—even with their finances strained to the cracking point by navy building—was willing to make practical response to President Coolidge's overture in that respect. It need hardly be said that the revelations of the Geneva conference as to the attitude of Great Britain on navy building and the refusal of France and Italy to enter the conference have not added strength to whatever sentiment has existed in the United States in favor of cancellation or even further reduction of European debts.

IN November, 1921, representatives of Great Britain, United States, Japan, France and Italy met in Washington and agreed to limit the size, armament, effective age and total tonnage of battleships and aircraft carriers. Agreement was reached also on definitions of cruiser and destroyer as ships respectively of 10,000 and 3,000 tons maximum displacement and of no larger than 8-in. and 5-in. guns. However, nothing was decided as to the number of ships or the ratio of total tonnage allowed to the powers in the various classes of auxiliary warcraft.

Shortly after this treaty a number of capital ships, either in commission or being built, were scrapped or converted to non-combatant purposes, as follows:

United States	32 ships	842,380 tons
British Empire	22 ships	447,750 tons
Japan	16 ships	354,709 tons
France and Italy	None	

Since that time, however, extensive building programs in auxiliary craft have been entered upon, summarized as follows:

United States	19 ships	(8 cruisers)
British Empire	58 ships	(17 cruisers)
Japan	123 ships	(16 cruisers, 33 submarines)
France	100 ships	(48 submarines)
Italy	57 ships	(15 submarines)

As a result of these activities the present strength of the three principal navies, as reported by the United States Naval Intelligence Office on May 1, 1927, is as shown in the accompanying table.

Viewing these large fleets and expensive building programs, President Coolidge invited the powers to extend the principles of the Washington treaty in order to limit auxiliary naval craft. France and Italy declined to discuss this matter, but representatives of the other three countries met at Geneva on June 21. W. C. Bridgeman, First Lord of the British Admiralty, Admiral Viscount Makoto Saito and Ambassador Hugh M. Gibson headed the respective delegations, comprised

PRESENT STRENGTH IN AUXILIARIES OF NAVIES OF THE UNITED STATES, GREAT BRITAIN AND JAPAN

	United States		Great Britain		Japan	
	Ships	Tons	Ships	Tons	Ships	Tons
First Line Cruisers (5 to 8-in. guns; 3000 to 10,000 tons; 27 knots speed or over):						
Built	10	75,000	40	194,000	19	102,000
Building	2	20,000	11	110,000	6	54,000
Appropriated for	6	60,000	6	54,000	4	40,000
Total	18	155,000	57	358,000	29	196,000
Second Line Cruisers:						
Built	22	179,000	7	30,000	9	52,000
Destroyers and Leaders (4-in. guns; 800 to 1500 tons; 27 knots or over):						
Built	276	329,000	178	217,000	82	91,000
Building or appropriated for	..	.....	9	12,000	26	43,000
Total	276	329,000	187	229,000	108	134,000
Submarines:						
Fleet submarines built	6	10,000	10	16,000	7	11,000
Building or authorized	3	(?)	15	20,000	19	20,000
700-ton submarines:						
Built	50	44,000	29	26,000	35	29,000
Building or authorized	..	.....	..	.....	1	1,000
Total	59	54,000	54	62,000	62	61,000

largely of naval experts, among whom our own Rear Admiral Hilary P. Jones was conspicuous.

The American Proposal

As there had been no preliminary conversations, each nation presented its own plan. Briefly, the American proposal was to extend the 5:5:3 ratio to auxiliary craft, with total tonnage in each class somewhere between the following limits, but preferably the lower:

	Great Britain and United States	Japan
Cruisers	250,000 to 300,000	150,000 to 180,000
Destroyers	200,000 to 250,000	120,000 to 150,000
Submarines ...	60,000 to 90,000	36,000 to 54,000

Comparison with the table of present strength shows that this proposal would have meant scrapping some American destroyers (which we rapidly built during the war for submarine chasers and 100 of which are out of commission), some British cruisers (the so-called Birkenhead plan contemplates 458,000 tons of cruisers by 1931), and some Japanese submarines. In the American view, economy would be served by limiting total tonnage.

The Japanese plan of a naval holiday was even simpler. It proposed the tonnage of the present fleets for the upper limit, additional construction to be undertaken only to replace antiquated vessels. Economy would be served by instituting a steady replacement program sufficient to keep the shipyards at a good state of efficiency. (A little computation will show that this extends the 5:5:3 ratio approximately to cruisers and destroyers, but gives equality on submarines.)

Great Britain approached the "limitation" and "economy" ideals of the conference by fixing her attention on the individual ship rather than the total tonnage. She proposed reducing size and armaments of capital ships (agreed upon in Washington) and extending the life before replacement. She would limit the number of 10,000-ton, 8-in. gun cruisers; would limit all other cruisers to 7500 tons and 6-in. guns; would reduce the Washington limit of 3000 tons for destroyers to 1750 tons, and so on. Economy would be served by building a less expensive ship and using it longer.

Thus on the very first day appeared the difference of view upon which the conference was eventually to split. Great Britain wished a large number of small cruisers to protect her foreign trade, while the American delegation was always insistent upon full freedom to build as many of the 10,000-ton cruisers carrying 8-in. guns as she wished, within the total tonnage agreed upon.

Britain's Plan Means Re-Armament

Having presented these divergent plans, a technical commission was appointed to work out in private some common points of agreement. Public discussion concerned the battleship and whether Great Britain would agree to parity with the United States in cruiser tonnage. By June 30, nine days after convening, everybody seemed agreed that the provisions of the Washington agreement concerning size and armament of battleships should not be disturbed in the absence of representatives of France and Italy. It also became known that Great Britain felt she needed 15 10,000-ton, 8-in. gun cruisers for her battle fleets and 55 lighter cruisers for commerce protection, none heavier than 7500 tons and carrying 6-in. guns. This gave a possible total of 562,000 tons in the cruiser category, which was so far greater than either the United States or Japanese proposal that compromise appeared impossible, although the British representatives talked *number* of ships and could not be pinned down to tonnage figures. Neither of the others wished to construct cruisers, to the 5:5:3 ratio, enough to match such a total, either in ships or in tons, and they felt that no agreement on "limitation" should be signed which would result in a big building program.

Meanwhile the experts had reached substantial agreement upon the rules for measuring tonnage. They also agreed that destroyers should carry nothing bigger than 5-in. guns and should not displace more than 1500 tons (except a limited number of flotilla leaders of 1850 tons), and that submarines should carry nothing larger than 5-in. guns, nor displace more than 1600 tons when designed for cruising, nor 600 tons when designed for coast defense. Apparently they could agree on submarines and destroyers, but only contingent upon an agreement on cruisers. Since the technical commission could not solve the cruiser problem, it adjourned on July 6, *sine die*.

Compromise Proposal Still High

After several days of conversation between the delegations a public session was held on July 14, in which Great Britain proposed to limit herself and United States until 1931 (when the Washington agreement will be reconsidered) to 12 10,000-ton cruisers for the battle fleet, to be included in a total of 400,000 tons cruiser strength. The remainder might be of any size less than 7500 tons and carry up to 6-in. guns—a ship which was characterized as "non-aggressive"—and since Britain intimated that protection of her commerce lanes required about 60 vessels, these would average about 5000 tons each, in order to come within the gross tonnage limit. Admiral Bridgeman felt that this number is conservative, in view of the fact that England possessed 114 ships of this sort in 1914. In this manner the English delegation scaled down their total cruiser tonnage to the United States maximum (which had meanwhile been increased 100,000 tons over the original proposal), but were still far from the Japanese preference of 250,000 tons, unrestricted as to size and armament (the original low limit proposed by the United States). It was understood that the United States would prefer to split the 400,000 tons into 18 10,000-ton cruisers and the remainder in others less than 7500 tons, but all mounting 8-in. guns.

After Japanese and British representatives had attempted vainly for a week to find some formula which would harmonize these divergent views, the chief British representatives were suddenly recalled to London on July 20 to confer with the Cabinet. On their return after eight days, public announcement was made of their utmost concessions as follows:

Final Disagreement

That for the purposes of limitation all auxiliary craft should be grouped together, and not exceed the total of 590,000 tons for both Great Britain and United States and 385,000 tons for Japan. (This is approximately the grand total of the original American plan). Within this total any amount of ships, either cruisers, destroyers or submarines, could be built, provided the 10,000-ton 8-in. gun cruisers did not exceed the values 120,000: 120,000: 80,000 tons for Great Britain, United States and Japan, respectively, and the submarines did not exceed 90,000: 90,000: 60,000 tons respectively. Furthermore, aside from these big cruisers, no ship should displace more than 6000 tons nor carry more than 6-in. guns. New and lower age limits in all classes were also proposed, together with permission to retain in service 25 per cent of the maximum tonnage in "over age" but still effective vessels.

In view of the American insistence on full freedom to install 8-in. guns on all cruisers, and the Japanese endeavor to inaugurate a naval holiday with parity in submarines, the further negotiations were fruitless, and the conference adjourned on Aug. 4, having failed of the purposes for which it was called.

Trumbull Company's Wide Strip Mill

Ten Horizontal Stands and Three Edging Mills— Five Finishing Stands Are Four-High— Large Use of Roller Bearings

ONE of the most interesting developments in the application of the principle of continuous rolling of sheets and wide strip steel is to be found in the new wide hot-strip mill which the Trumbull Steel Co. placed in operation on June 15. This mill has a capacity to roll strip steel up to 30 in. wide and eventually, with some slight changes, will be able to roll steel 36 in. wide.

In general plan, the mill is shown in the diagram. It consists of three slab-heating furnaces, five two-high roughing stands, three vertical edging mills, five four-high finishing stands, with necessary roller tables, cooling bed, shears, reel and other auxiliary equipment.

The arrangement provides straight-away operation and complete mechanical control from the time the slab leaves the furnaces until, without further heating, the rolling is completed and the strip in any length to meet commercial requirements is either coiled or is cut to length in its flat form. In its straight-line course the material moves about 650 ft. from the heating furnaces to the shears or reel at the end of the cooling bed. The time required for the material to go through the various passes from the first roughing to the last finishing stand has been reduced to a minimum.

Three continuous heating furnaces arranged in line are used for heating the slabs; they are of the gravity discharge type, 11 ft. wide and 44 ft. long. The furnaces are fired by either producer or coke oven gas, or a combination of the two gases can be used.

The slabs, 2½ in. thick and in widths suitable for the strip to be rolled, are taken from the slab storage adjacent to the furnaces by means of an overhead crane and placed on skids in the rear of the furnaces. An electric pusher charges the slabs into the furnace. They are gradually pushed forward until the desired rolling temperature is obtained, when they are discharged by gravity on to the furnace table *A*, which conveys them to the skew table *A*1 in front of No. 1 edging mill.

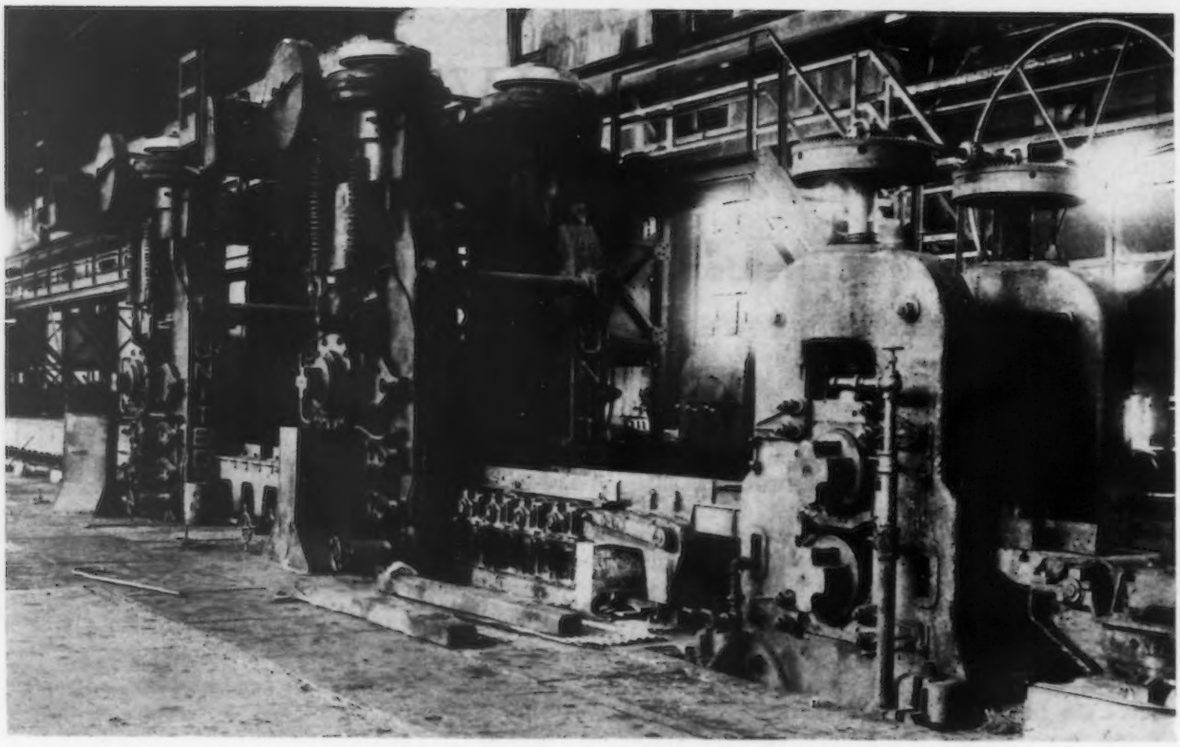
First Rolling Operation Is Edging

Edging mills are located in front of No. 1 and on the delivery sides of Nos. 2 and 4 roughing stands. As shown by one illustration, they are of the overhung vertical type and are massive in design. The three edging mills are of the same general construction, having roller bearings of ample size for the vertical shafts. All gearing is fully inclosed and runs in oil. No. 1 edger is driven by a 300-hp. motor and Nos. 2 and 3 edgers by 100-hp. motors.

Lateral adjustment of the vertical edging rolls is obtained by means of a large screw connected to each roll carrier and driven through a worm-and-gear reduction by a 12-hp. motor.

Having rolls 22½ in. in diameter and 36 in. long,

Five 2-High Roughing Stands and Three Edging Stands Constitute the Roughing Train. The edging mills are of the overhung vertical type and are massive in design, as indicated by the picture. These stands have roller bearings and all gearing is fully inclosed and runs in oil



No. 5 Roughing Stand (at right) and the First Two 4-High Finishing Stands. Two of the rolls of each finishing mill are backing up rolls, which have roller bearings

the first four roughing stands are driven through a bevel-gear train and single-gear reduction by a 1500-hp. motor. One illustration shows the No. 5 roughing stand and the first two four-high finishing stands. These three stands are driven through a bevel-gear train and single-gear reduction by a 5000-hp. motor.

Each of the last three four-high finishing stands, shown together in one view, is driven by a single-gear reduction and a 2000-hp. motor. All five of the four-high finishing stands are of the same general construction, having working rolls 16 in. in diameter and 42 in. long and backing up rolls 32 in. in diameter and 42 in. long, carried in roller bearings. The roller bearings on these mills have a load capacity of about 1,000,000 lb. A pair of these roller bearings with their bearing cases weighs about 13,000 lb. These large and massive roller bearings are required to carry the tremendous pressure exerted between the working rolls, when rolling wide and thin strip.

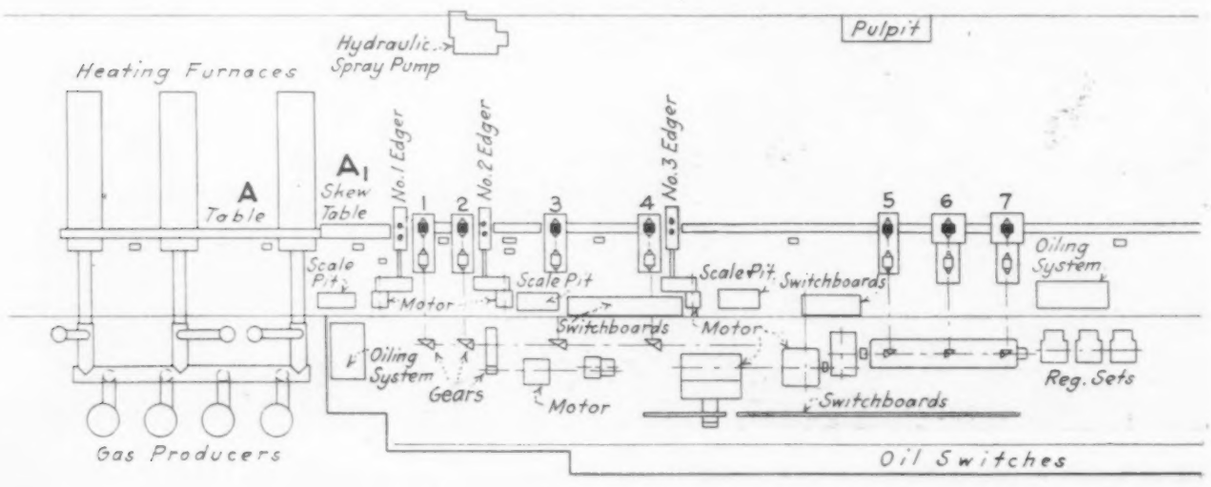
The Trumbull four-high mills are said to be the first of their kind to have electrically driven screw-downs, in which each screw is driven by an independent motor. The motors are so arranged that they can be operated independently or both together, giving an almost instantaneous adjustment of the rolls, thus insuring strip true to gage and free from camber.

From the operating platforms, from which the mill is controlled, the operator has a clear view of the strip as it passes from mill to mill. He can quickly make any adjustment needed at any mill by actuating electric push buttons which control the screwdown in either the up or the down direction.

Pinions and driving shaft, and the operators' platforms above the mills, are shown in one photograph. Between the various mill stands suitable roller tables have been provided, with four air-operated loopers located between the last six stands.

Disposal of Finished Strip Steel

As the finished strip leaves the last stand at a speed varying from 635 to 1060 ft. a minute, it is conveyed by a roller table to the cooling bed. This



General Layout of the Mill, Showing Straight Flow of Material

Screwdowns Are Operated from the Platform Shown Above the Mill. This shows also the mill pinions and driving shafts. The motor room is at right

(double) bed is 48 ft. wide and 165 ft. long, with roller tables extending along each side for conveying the cooled strip to the shears. Strip which is to be sheared is discharged by an electrically operated kick-off from the center roller table to either the right or the left bed, and is moved transversely across the bed to the shear approach tables.

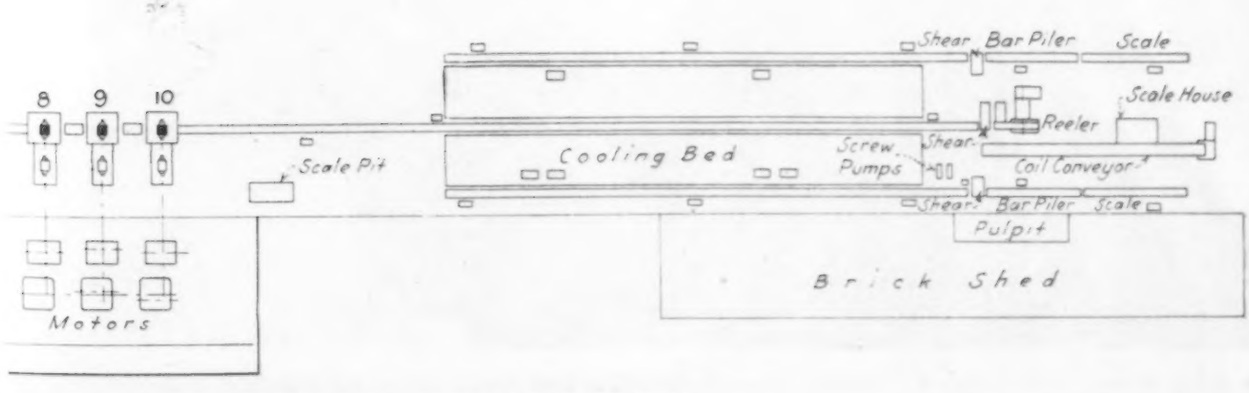
When coiled strip is desired, the material is carried by the roller table extending through the center of the cooling bed to the reeler shown in one illustration, located at the end of the cooling bed. A shear for cropping the ends of the strip is placed in front of the reeler.

Coiled strip is discharged by an air-operated pusher on to a slat conveyor located in front of the reeler, as shown. After each coil is discharged, the conveyor is moved forward enough to allow room for the next coil. The conveyor is of sufficient length to permit the material to cool so that at the delivery end the coils can be lifted off in groups of five or six by a magnet depending from an overhead electric crane.

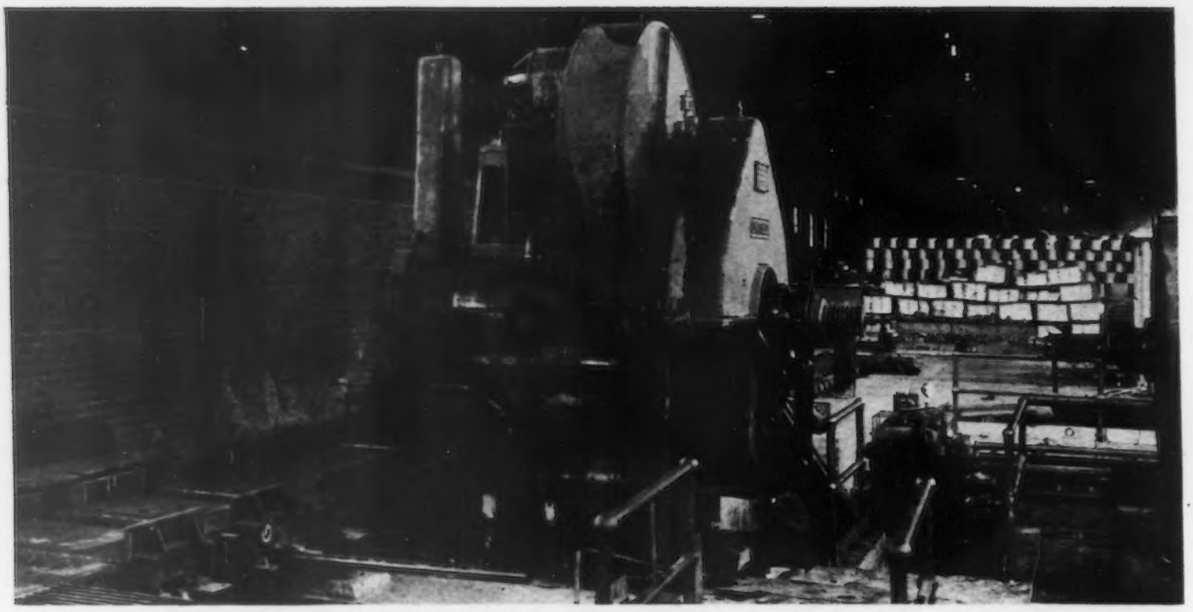
This coil conveyor and the method of handling the coiled strip is another innovation installed by the Trumbull Steel Co. Heretofore, it was the usual practice to discharge the coil on to a star wheel, which caused the coil, due to its own weight, to assume an elliptical form. This condition is entirely eliminated by the use of this specially designed conveyor.

At the end of each shear table is located a shear having a 42-in. knife and with a capacity for shearing 36-in. strip of the heaviest gages rolled. Each shear has a motor-operated gage of massive and rigid construction. The shears are equipped, also, with pilers of special design. Both the gage and piler permit strip in any length up to 32 ft. to be cut and piled to a height of 18 in., either in one width 36 in. wide or in multiple pieces equivalent to the maximum width.

On the top of the piler is a motor-driven roller table. When the cut material has been piled to the desired height, it is conveyed forward and discharged to a roller table on top of the weighing scale. A scale house located midway between the two scales permits one scaleman to weigh the material for both sides of the mill. After the material is weighed it is lifted



from the Furnaces, at Left, to the Bar Pilers and Reeler, at Right



One of the Shears at the End of the Shear Tables. These have a capacity for cutting 36-in. strip in the heaviest gages. The shears are equipped with hydraulically operated pilers

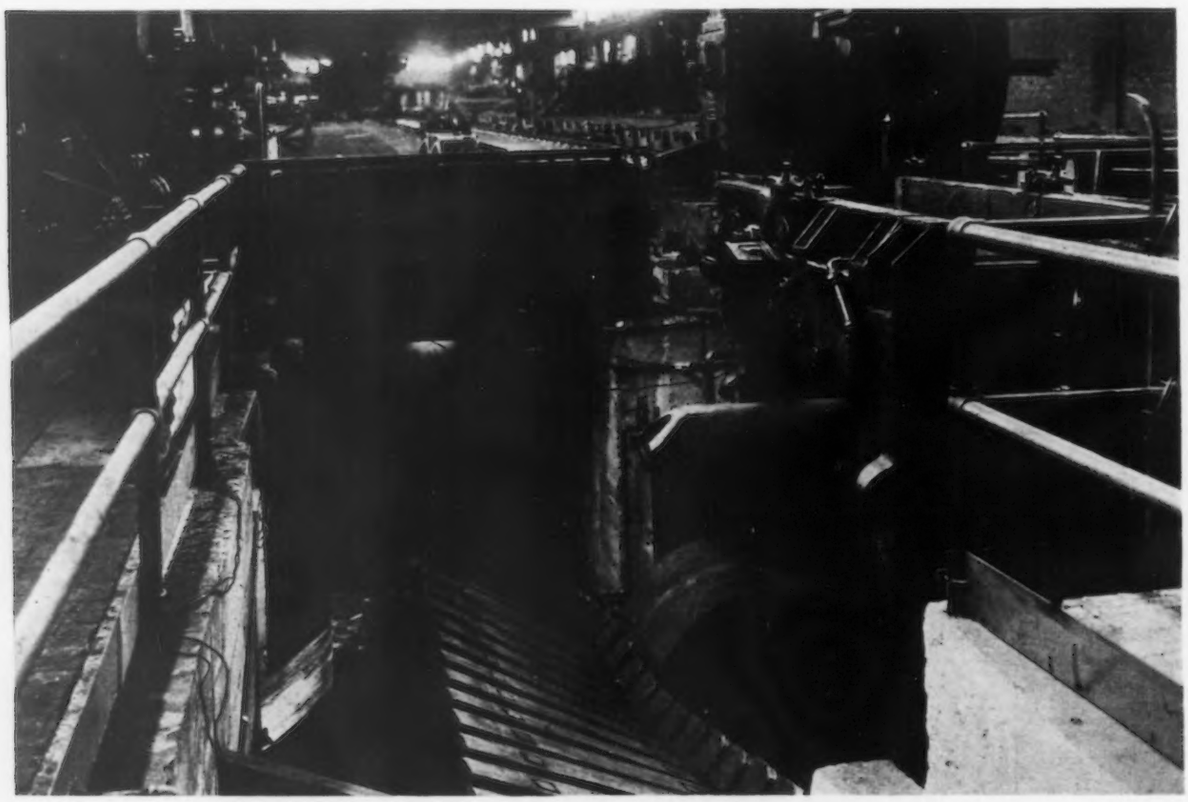
from the scale tables by an overhead crane equipped with an equalizing beam and hooks and is loaded into cars or piled.

All of the mill drive motors are of the variable-speed type, permitting great flexibility in the operation of the mill. These motors are housed in a brick building adjacent and parallel to the main mill building. The switchboards, oil switches, etc., are placed in a lean-to to this building. The mill motors, roller tables and loopers are operated from a pulpit located opposite the No. 5 stand, this position giving the operators a clear view from one end of the mill to the other.

The roller bearings on the four-high finishing stands and on the edging mills, all pinions, driving shaft bearings and gear drives, with the exception of the bevel-gear train of the first four roughing stands, are lubricated by a forced feed oiling system. On account of the great length of the mill, and to permit returning the oil by gravity to the storage and filter tanks, two complete oiling systems were installed. One is of 3000 gal. capacity, for the roughing end of the mill, and one of 6500 gal. capacity, for the finishing mills.

After being filtered, the oil is pumped up to a pressure of 35 lb. and delivered through an elaborate system of pipes to the various points to be lubricated, and then returned by gravity to the system. A high-grade 1700 viscosity oil is used, necessitating pipes as large as 8 in. in diameter to return this heavy oil.

To assure strip free from rolled-in scale, a high-pressure hydraulic spraying system has been installed, with spray pipes conveniently located to spray the slab, top and bottom, as it passes between them.



When Strip Is to Be Coiled, It Is Carried Down the Roller Table at the Center of the Hotbed to a Reeler (right foreground). A shear at front of the reeler crops the ends of the strip. A new design of coil conveyor carries away the coils discharged from the reeler

Machine Tool Replacement Vital

Need of Progressive Policy Stressed at Sessions Held During New Haven Exhibition—Tendencies in Design Discussed

MODERN shop equipment as the means of meeting high pressure competition was dealt with by several speakers at technical sessions arranged in connection with the seventh New Haven Machine Tool Exhibition, which was held at the Mason Laboratory of Mechanical Engineering, Yale University, Sept. 6-9. The display of machine tools, by concrete demonstration of high productive or other excellence, served further to bring home the advantages of modern manufacturing facilities.

The technical sessions, held on the mornings of Sept. 7, 8 and 9, were under the auspices of the machine shop practice division of the American Society of Mechanical Engineers, and made up the first national meeting of that division.

With the keen competition now existing in all manufacturing lines, the organizations which survive will be those that have equipped themselves with the best plant and best personnel, said Myron Curtis, chief engineer, Potter & Johnston Machine Co., Pawtucket, R. I., in a paper on "The Economies of Machine Tool Replacement." The tendency to cling to obsolete machinery simply because it is in good condition and is capable of doing about the same amount of work which it did when it was installed, will eventually put any concern out of business, he said.

What Makes a Machine Tool Obsolete?

Two things which make a machine tool obsolete, said he, are: First, the nature of the tool and the way it has been treated; second, the developments of the art through which the modern tool produces more than the one it supplants.

Relating to the first item, it was pointed out that a tool may be in such shape that it is unable to produce sufficiently accurate work, or it may be that repairs are altogether too frequent, and result in excessive waste of productive time. This may be due to faulty design of the machine tool or to careless handling, particularly in regard to keeping the machine clean and oiled. A machine tool may be obsolete for the work it is performing, but may be very useful and economical on some other job. In such cases the tool should be transferred to the other work and a new tool provided for the work which is beyond the capacity of the first one. If, however, there is no job on which the tool can be economically placed, it should be immediately scrapped, as it is too costly to use.

In discussing obsolescence due to the improvement in the art, it was emphasized that the machine-tool industry has made enormous strides in the last five years, and it was stated that nearly every type of machine tool built prior to 1921 is totally obsolete for production. "The machine-tool builder," said Mr. Curtis, "is designing to take feeds and speeds which were unheard of even five years ago, and is taking full advantage of the developments in high-speed cutting tools. Five years ago the art of making cutting tools was far ahead of machine-tool design. Few, if any, machines were capable of forcing high-speed steel to the limit. This condition has changed and the capacity of the modern machine tool is dependent wholly upon the ability of the cutting tool to stand up. Of course, all machines built five years ago are not obsolete for all classes of work. Certain jobs are inherently too weak in themselves to withstand heavy feeds and speeds, or can be machined just so fast because of the distortion due to heat and the limits required."

Three main tendencies of improved design were said to be: (1) Increased power and rigidity, together with the correlative ability to withstand abuse; (2) increased convenience for the operator; and (3) more foolproof construction. These, it was stated, have resulted in enormous increase in the productive capacity of machines, and increase of productive hours because of freedom from breakdowns. It was pointed out that more and better placed material is used in beds, gear boxes, carriages, etc., and that today machines are not only made strong enough to withstand the strains imposed but also heavy enough to absorb vibration at the cutting edge of the tool. The use of alloy steels for shafts, gears, etc., and of anti-friction bearings for all fast-running high-duty shafts, was referred to. Increased convenience in operation has been accomplished by the grouping of levers, the accessibility of change gears, cams, etc., all of which materially reduce setting-up time, and by reducing fatigue, make it possible for the operator to produce more in a given period. More foolproof construction, it was pointed out, is necessary today, because the operating of machine tools under production conditions has definitely changed to unskilled labor. The use of interlocking levers, safety devices such as slip frictions and shear pins, and, on some of the simpler tools, hydraulic feeding mechanism is therefore noted.

The matter of oiling has received considerable attention. Five years ago most machine tools were oiled by means of the old-fashioned oil can. Today are to be noted the use of inclosed gear boxes, the gears in which run in oil; mechanical oiling systems such as have been for a long time used on engines; unit oiling systems, usually with a sight-feed drip whereby one or two oil reservoirs supply the entire machine; and, more recently, the development of the one-shot oiling system.

Comparison of present and former models of several machine tools, including a hydraulic broaching machine, an engine lathe, a flat-turret lathe; an internal grinder; a milling machine and an automatic chucking machine, was briefly made by Mr. Curtis. The object of presenting these comparisons was to show that the machine tool of today is markedly more efficient than that of five years ago not only as to production but also as to operating cost.

Shop-Equipment Policies in Representative Plants

Another paper received with interest at the opening session, Sept. 7, was on "Shop Equipment Policies in Representative Plants," by L. C. Morrow, managing editor of the *American Machinist* and chairman of the machine shop practice division of the A.S.M.E. The paper dealt primarily with keeping machine tools up-to-date, the subject being discussed under a number of subdivisions, which included reasons for discarding equipment, time allotted the machine to pay for itself and the importance of the human equation in equipment policies.

Equipment is discarded, it was pointed out, because it is worn out or because it is obsolete. "Experience proves that there is a relation between the cost of repairs and the cost of new machines, that, if determined accurately, will indicate when expenses for repairs are no longer justified," said Mr. Morrow. "There are to be taken into consideration the losses due to the non-productiveness of the machines while in course of repair. The repair cost is being maintained by some of the largest users of machine tools. If the plan should be adopted universally much of the ancient equipment now in use would be withdrawn from active service. Moreover, the records of the costs of repairs, used with the records of initial costs,

would enable all users of equipment to arrive at sound rates of depreciation.

"Obsolescence is brought about by several influences. They are: Improvements in the design of machine tools; increased output requirements; changes in the design of the product of the user; and elimination of uneconomical manufacturing operations. Also changes in the methods of manufacture of the product of the user; the effect upon the investment in materials in process; the effect upon floor space, and the effect upon power consumption."

How Much Better Must the New Machine Be?

The time during which new equipment must pay for itself from earnings was also discussed by Mr. Morrow. On this, he said: "There arises the question, 'How much better than the old must a new machine be?' From the data available it seems that the consensus of opinion is that it must be very much better indeed. The automotive industry is very strongly inclined toward the belief that the new machine must be so much better that it will pay for itself from increased earnings within one year, although they do not necessarily scrap the one-year-old machine. Other manufacturers vary from a limit of one year to a limit of four or five. A railroad repair shop allows as much as six or seven years. One or two refuse to set a limit, taking the stand that each purchase must be made strictly upon the merits of the case. The principal argument advanced to substantiate the claim that one year is the proper limit, is that there are yearly changes in the product manufactured that are likely to make much equipment worthless. No doubt that argument carries weight when special machinery is being considered."

Two examples cited to show to what extent some users of machine tools have gone to determine on an engineering basis their policies of discarding and purchasing equipment were given as follows:

"For example, one manufacturer uses a formula to say that the number of months in which a piece of equipment will pay for itself is equal to the total of expenditures for the new equipment divided by the total of savings per month. Stated more elaborately, it says that *the number of months in which the equipment will pay for itself* equals *the cost of the new equipment installed* plus *the cost of tooling the new equipment* plus *the cost of interest for X years at 6 per cent* (*X* equaling the number of years determined upon as the maximum time during which the equipment must pay for itself) plus *the cost of depreciation for X years at 10 per cent* plus *the book value of the displaced equipment*, that sum divided by the difference between *the existing rate* (*or cost*) *per piece* and *the estimated rate per piece on the proposed new equipment* multiplied by *the number of pieces to be produced per day by the proposed equipment*, multiplied in turn by *the number of working days per month*, to which product is added *the savings in overhead per month.*

"In that formula it is considered that the savings are made up of productive labor, and that if the expense of productive labor is cut in half, the percentage of overhead to productive labor is increased 10 per cent. This conclusion is reached as a result of cost determinations, and there is no doubt that it applies in the plant using the formula.

"Another manufacturer uses practically the same formula, except that he determines his change in overhead from a "burden control record," that shows direct labor charges; direct burden charges (under which there are 14 sub-divisions); indirect burden charges (under which there are 8 sub-divisions); and fixed charges (under which there are 6 sub-divisions).

A section of the paper was devoted to buying methods, the practice of some 13 different companies being outlined. Sources of information used by users of machine tools to enable them to keep pace with developments were listed by Mr. Morrow as follows: The new equipment sections of the technical press; advertisements in the technical press; machine tool salesmen; machinery expositions; and plant visits.

The importance of machine tool records, not alone for cost, depreciation and inventory purposes, but for carrying a record of the costs of repairs and comparative data needed in dealing with the equipment problem, was also pointed out.

One advantage of up-to-date machine equipment stressed by Mr. Morrow was the effect upon employees. On this he said, in part:

"Modern machinery has taken much of the onerous heavy labor from the backs and hands of the workmen. Power rapid-traverse mechanisms have eliminated the heavy and time-wasting cranking formerly necessary to elevate cross-rails and to traverse heads and tables. Improvements such as push-button control have reduced danger to both machinery and men and have saved much time formerly wasted. Proper and complete guards have greatly reduced the hazards of machine-shop work, have saved much suffering and much money. Convenient controls have added to the day's production and have made it possible for the operators of the heaviest machines to leave the shop after a day's work still comparatively fresh. These improvements, inherent in up-to-date equipment, have benefited machine-tool-building and machine-tool-using industries greatly because of the increased satisfaction of the shop personnel."

C. R. Burt, vice-president and general manager of the Pratt & Whitney Co., Hartford, presided at the session. Among those discussing the papers were H. P. Bailey, assistant to the president, Warner & Swasey Co., Cleveland. F. O. Hoagland, consulting engineer, Boston; Carl Barth, consulting engineer, New Haven; H. S. Beal, assistant general manager, Jones & Lamson Machine Co., Springfield, Vt.; J. H. Connolly, Standard Machinery Co., Auburn, R. I., and E. P. Blanchard, Bullard Machine Tool Co., Bridgeport.

Reequipping Policies Advocated at New England Industries Banquet

NEW equipment—the vital need for reequipment programs in the older manufacturing plants of New England and other parts of the East, to meet competition from other sections of the country—was the keynote of several addresses at the New England Industries Banquet, held at the Hotel Taft, Sept. 8, under the auspices of the New England Council, the Manufacturers Association of Connecticut, Inc., and the New Haven Chamber of Commerce. E. Kent Hubbard, president of the manufacturers association, was toastmaster.

The Hon. John H. Trumbull, Governor of Connecticut, in an interesting address on "New England, the Birthplace of American Industry," indicated that the future of New England industries depends upon the extent to which those industries respond to programs of reequipment. Charles R. Gow, president of the Gow Co., Inc., Boston, and former president of the Associated Industries of Massachusetts, in speaking on "Survey of Industrial Conditions," advocated rebuilding to meet competitive conditions, a point of beginning being in the modernizing of machinery. Research and development work were also stressed as necessary. Charles L. Newcomb, manager of the Deane Works, Worthington Pump & Machinery Corporation, Holyoke, Mass., expressed the view that the managers of many New England industries had been uneconomically thrifty. Stabilization, especially as to money values; the need of alertness as to production methods, in view of probable increase of foreign competition; standardization between industries; the need of scientific and engineering research; and the further elimination of waste in industry were dealt with by L. W. Wallace, secretary American Engineering Council, in an address on the "Future Problems of Industry."

Some results of an extensive reequipment program were summarized by C. R. Burt, vice-president and general manager Pratt & Whitney Co., Hartford, who spoke on the "Installation of New Machinery and Methods in the Plant of the Pratt & Whitney Co."

Revamping of the plant began in September, 1925. Machinery was taken out of the additional buildings

acquired during the war period, and these buildings were rented. In considering the program of rearrangement of the remaining units of the plants, it was decided to remove all antiquated machinery, as well as all other unprofitable equipment, most of which was subsequently scrapped. Departments were consolidated, and all departments relocated to reduce handling costs. In several cases it was necessary to connect buildings by bridges in order to minimize the time required in going from one building to another.

New molding machines, core ovens, conveyors, etc., were provided for the foundry and, having decided to buy forgings from outside sources, the forge shop was closed up and the equipment sold. Because of its central location the forge plant was turned into a maintenance department. In all 19 departments were moved, the moving being accomplished over the week end, so that on Monday the departments moved could continue production operations. The painting of the walls of all buildings, including the foundry, was a feature of the program, it being held that a clean shop aids in maintaining fine workmanship.

Session Devoted to Foremanship Training

One of the technical sessions held Sept. 8, under the auspices of the machine shop practice division of the A. S. M. E., was devoted to foremanship training. Speakers included J. A. Moyer, director, Massachusetts University Extension, Boston, and C. H. Klinefelter, Federal Board for Vocational Education, Washington. L. D. Burlingame, industrial superintendent Brown & Sharpe Mfg. Co., Providence, was chairman.

"Modern Finishes for the Machine Tool Industry," by W. R. Atwood, chemical products division of E. I. Du Pont de Nemours & Co., Parlin, N. J., was presented at another session on Sept. 8. A paper on the "Fundamentals of Polishing," by Bradford H. Divine, Divine Brothers Co., Utica, N. Y., also presented, was abstracted in THE IRON AGE of Sept. 8. J. H. Connolly, Standard Machinery Co., Auburn, R. I., presided.

Two papers were read at a meeting devoted to anti-friction bearings, held Sept. 9. One, by Frank Brauer, chief draftsman, Watertown Arsenal, Watertown, Mass., described the use of "Anti-Friction Bearings in Ordnance Work." The second paper, by R. F. Runge, vice-president S K F Industries, Inc., New York, was on the "Recent Developments in the Application of Anti-Friction Bearings to Machine Tools." The chairman at this session was W. J. Peets, engineer, Singer Mfg. Co., Elizabethport, N. J.

"Improvements in Copper Wire Mill Equipment," by Samuel McMullan, Western Electric Co., Chicago, and "Manufacture and Application of Extruded Tubes," by G. A. Foisy, engineer, U. S. Cartridge Co., Lowell, Mass., were features of the metal working session arranged for Sept. 9.

It is planned to make further reference to several of the papers noted above in forthcoming issues of THE IRON AGE.

Next New Haven Machine Tool Show in 1929

MORE than 80 companies were represented at the exhibition which, as in previous years, was held in Mason Laboratory, Yale University. Equipment was attractively displayed, and much of it was of new or improved design. The machinery was for the most part in actual operation on production work.

It was announced that the next New Haven Machine Tool Exhibition will be held Sept. 3, 4, 5 and 6, 1929. The exhibition committee includes representatives of Yale University, the New Haven Chamber of Commerce, and the New Haven section of the A. S. M. E.

A list of the exhibitors and some of the equipment featured are given below.

The Bullard Machine Tool Co., Bridgeport, showed two models of its Mult-Au-Matic; the Goss & DeLeeuw Machine Co., New Britain, exhibited a motor-driven automatic chucking machine, and the Jones & Lamson Machine Co., Springfield, Vt., had a 15-in. J. & L. chucking machine in operation. Automatic screw machines and chucking machines were shown by the New Britain Machine Co., New Britain, Conn. A new Gridley multiple-spindle automatic screw machine was featured by the National Acme Co., Cleveland, another new unit being the No. 5 B automatic chucking and turning machine of the Potter & Johnston Machine Co., Pawtucket, R. I. The Divine Brothers Co., Utica, N. Y. had an automatic flat stock polishing machine in operation and the Racine Tool & Machine Co., Racine, Wis., displayed a new production sawing machine with three speed transmission. The Keller Mechanical Engineering Corporation, Brooklyn, N. Y., featured a full automatic tool room machine as well as its Kellocater for laying out and jig boring. Marking machines were demonstrated by the Noble & Westbrook Mfg. Co., Hartford, a drill grinder by N. W. Ordway & Son, Hartford, punch presses and other machines by the E. W. Bliss Co., Brooklyn, N. Y., and a No. 0 universal iron worker by the Buffalo Forge Co., Buffalo, N. Y. A new rolling mill for thin stock was among the features at the booth of the Standard Machinery Co., Auburn, R. I. Drop hammers were shown by the Pneumatic Drop Hammer Co., Boston, and a new portable sheet cutter was featured by the Unishear Co., Inc., New York.

New die heads were shown by the Eastern Machine Screw Corporation, New Haven, and also by the Geometric Tool Co., New Haven. The Pratt & Whitney Co., Hartford, displayed small tools and gages, and the Bausch & Lomb Optical Co., Rochester, N. Y., had on view optical devices for machine shop use, as well as metallographic and photomicrographic outfits. Tools for lathes, planers, etc., and also inserted tooth milling cutters were featured by the O. K. Tool Co., Shelton, Conn. Makers of ball and roller bearings included the Fafnir Bearing Co., New Britain; the New Departure Mfg. Co., Bristol; the S. K. F. Industries, Inc., New York; the Shafer Bearing Corporation, Chicago; and the Timken Roller Bearing Co., Canton, Ohio.

Several items of welding and cutting equipment, including the new atomic hydrogen arc welding apparatus of the General Electric Co., Schenectady, were shown. In addition to welding supplies, the Air Reduction Sales Co., New York, demonstrated its oxygraph and its radiograph machines and welding and cutting equipment was exhibited by the Oxweld Acetylene Co., New York. The Machinery Dealers Corporation, New Haven, displayed a spot welding machine.

Safety set screws were shown by the Bristol Co., Waterbury; belt lacers by the Clipper Belt Lacer Co., Grand Rapids, Mich.; die sets by Danly Machine Specialties, Inc., Chicago; machine guards by Charles K. Dickgiesser & Co., Derby, Conn.; brass melting furnaces and pots hardening furnaces by the New Haven Gas Light Co., New Haven; compressors and pumps by the Pennsylvania Pump & Compressor Co., Easton, Pa.; flexible metallic hose by the Titeflex Metal Hose Co., Newark, N. J. The Yale & Towne Mfg. Co., Stamford, Conn., exhibited late models of industrial trucks.

Eighteen companies were represented by Botwinik Brothers, New Haven. These companies and the products they manufacture, are as follows: Ames Co., Brooklyn, N. Y., spot welders; Carroll & Jamieson Machine Tool Co., Batavia, Ohio, engine lathes; Davis Keyseater Co., Rochester, N. Y., key seaters; Draver Electric & Mfg. Co., Richmond, Ind., bench band saws; C. O. Hall, New York, electric motors; Hisey-Wolf Machine Co., Cincinnati, portable electric tools; Holsclaw Brothers, Evansville, Ind., arbor presses; Marathon Electric Mfg. Co., Wausau, Wis., electric motors; Oliver Instrument Co., Adrian, Mich., drill grinders and filing machines; Quincy Compressor Co., Quincy, Ill., pumps and compressors; Reed Mfg. Co., Erie, Pa., pipe cutters, stocks and dies; Rockford Iron Works, Rockford, Ill. power presses; Rowbottom Machine Co., Waterbury, Conn., cam cutting machines; Sloan & Chase, Inc., Newark, N. J., bench lathes and bench milling machines; South Bend Lathe Works, South Bend, Ind., engine lathes and attachments; Tobrin Tool Co., Plantsville, Conn., bench saw tables; and F. O. Wells Co., taps and reamer sharpeners.

The Triplex Machine Tool Co., New York, had in operation a number of machines including Societe Genevoise jig boring machines; Pfauter gear hobbers and hob sharpening machines and also a Mikron automatic pinion hobbing machine. High speed grinding spindles and standardized jig bushings of the Ex-Cell-O Tool & Mfg. Co., Detroit, were also on view as well as a LaPorte filing machine and forcing presses of the General Mfg. Co., Detroit.

Seven companies were represented by the Arthur C. Morse Co., New Haven. These companies and the products they manufacture are Bird Machine Co., South Walpole, Mass. short-center belt drive; Brown Engineering Co., Reading, Pa., clutches; Carr Fastener Co., Cambridge, Mass., Dot lubricating devices; Reliance Electric and Engineering

Co., Cleveland, electric motors; Stanley Belting Corporation, New York, new Larson belt lacing machine; and the L. J. Wing Mfg. Co., New York, ventilating and unit heating devices.

The six companies represented by the Page, Steel & Flagg Co., New Haven, were: Charles Bond Co., Philadelphia, gears; the Bond Foundry & Machine Co., Mannheim, Pa., truck casters; Peerless Surfacing Machine Co., Troy, N. Y., surfacing machines; and the Wright Mfg. Co., Lisbon, Ohio, hoists.

The Cleveland Worm & Gear Co., Cleveland, gear reduction units; the Poole Engineering & Machine Co., Baltimore, flexible couplings; and the Mansaver Co., material handling equipment; were represented by the J. B. Engineering Sales Co., New Haven. In the space of Hunter & Havens, Hartford, pot type electric furnaces manufactured by the American Metallurgical Corporation, Boston, and a new automatic enveloping machine for packaging screws, washers, etc. of the General Engineering Co., Hartford, were demonstrated. Gears and other transmission equipment of the Boston Gear Works Sales Co., Norfolk Downs, Quincy, Mass., were displayed by C. S. Mersick & Co., New Haven.

A feature of interest at this year's exhibit was the special display of work-holding devices such as clamps, vises, chucks, lathes, faceplates, center and steady rests, arbors, jigs and fixtures arranged by the committee in charge of the exhibition. This display not only showed modern equipment of these types but served to contrast early models with those of more recent date. Wherever possible, the important stages in the development of these devices were traced.

Business Heads to Formulate a Platform of American Industry

HEADS of industries from 35 industrial States of the Union have been called to meet, Sept. 14, at the Waldorf-Astoria Hotel, New York, in the organization meeting of the Platform of American Industry Committee of One Hundred, brought together under the auspices of the National Association of Manufacturers. The committee is to draft a national platform to be submitted to the manufacturers of the nation at their convention in Chattanooga next month and later to be placed before both the Republican and Democratic conventions as guiding principles industry believes any national administration should take cognizance of for the best interests of the country.

The platform committee, following the drawing of the platform, will hold meetings through the winter and spring to introduce planks on any new important problem that may inject itself. Suggestions have been submitted to the association for planks in the platform, and the tentative subjects include: Government ownership and participation in business; American merchant marine; disarmament, industrial preparedness and national defense; taxation; immigration and naturalization; tariff; judiciary; flood control; foreign trade policies; conservation of natural resources; agriculture; patent offices; revision of postal rates; Pan-Americanism; international relations and foreign debts; regulation of combinations; alien property; women in industry; railroads; waterways development; commercial aviation; highways; private employment relation, and juvenile education and employment.

The committee of One Hundred includes the following:

C. M. Jesperson, treasurer Southern Manganese Corporation, Anniston, Ala.

Julius Goslin, president Joubert & Goslin Machine & Foundry Co., Birmingham.

Constant Meese, 500 Lake Park Boulevard, Oakland, Cal.

E. J. Yetter, president Western Elaterite Roofing Co., Denver.

F. S. Chase, president Chase Companies, Waterbury, Conn.

Willis F. Hobbs, president Bridgeport Hardware Mfg. Co., Bridgeport.

Clarence E. Whitney, president Whitney Mfg. Co., Hartford.

C. A. Dunham, president C. A. Dunham Co., Chicago.

Robert P. Lamont, president American Steel Foundries, Chicago.

William Butterworth, Deere & Co., Moline, Ill.

E. B. Leigh, president Chicago Railway Equipment Co., Chicago.

C. H. Markham, chairman of the board, Illinois Central System, Chicago.

A. H. Mulliken, president Pettibone Mulliken Co., Chicago.

W. B. Storey, president Atchison, Topeka and Santa Fe Railroad, Chicago.

H. C. Atkins, president E. C. Atkins & Co., Indianapolis.

S. D. Bechtel, president S. F. Bowser & Co., Fort Wayne.

Clifford S. Anderson, Norton Co., Worcester.

H. C. Beaver, treasurer Rolls-Royce Co. of America, Springfield, Mass.

R. E. Thompson, vice-president Gillette Safety Razor Co., Boston.

Thomas M. Simpson, secretary Continental Motors Corporation, Detroit.

John Trix, president American Injector Co., Detroit.

A. T. Waterfall, vice-president Dodge Brothers Co., Detroit.

H. I. Finch, president Emerson Electric Mfg. Co., St. Louis.

Henry Abbott, president Calculagraph Co., New York.

William H. Barr, president W. H. Barr, Inc., Buffalo.

N. J. Gould, president Goulds Pumps, Inc., Seneca Falls, N. Y.

Carl Hallauer, Bausch & Lomb Optical Co., Rochester.

E. M. Herr, president Westinghouse Electric & Mfg. Co., New York.

E. F. Loomis, president Lehigh Valley Railroad, New York.

F. L. Morse, president Morse Chain Co., Ithaca, N. Y.

W. A. Anderson, John A. Roebling's Sons Co., Trenton, N. J.

William A. D. Evans, president Cooper-Hewitt Electric Co., Hoboken, N. J.

Enos Paullin, secretary Ferracute Machine Co., Bridgeton, N. J.

S. P. Bush, president Buckeye Steel Castings Co., Columbus, Ohio.

Frank Collins, executive vice-president National Supply Co., Toledo.

F. R. Fishback, president Electric Controller & Mfg. Co., Cleveland.

P. O. Geier, Cincinnati Milling Machine Co., Cincinnati.

Henry Howard, Grasselli Chemical Co., Cleveland.

Charles B. King, vice-president Marion Steam Shovel Co., Marion, Ohio.

John F. Ohmer, president Ohmer Fare Register Co., Dayton.

George M. Verity, president American Rolling Mill Co., Middletown, Ohio.

C. W. Asbury, vice-president Enterprise Mfg. Co., Philadelphia.

W. W. Atterbury, president Pennsylvania Railroad Co., Philadelphia.

Frank Disston, president Henry Disston & Sons, Inc., Philadelphia.

A. L. Humphrey, president Westinghouse Air Brake Co., Pittsburgh.

George L. Markland, Jr., chairman of the board, Philadelphia Gear Works, Philadelphia.

Staunton B. Peck, vice-president Link-Belt Co., Philadelphia.

Henry D. Sharpe, treasurer Brown & Sharpe Mfg. Co., Providence, R. I.

I. B. Merriam, president-treasurer Chattanooga Boiler & Tank Co., Chattanooga.

E. H. Sholar, president Chattanooga Implement and Mfg. Co., Chattanooga.

W. W. Coleman, president Bucyrus Co., South Milwaukee, Wis.

E. J. Harvey, president Harvey Spring & Forging Co., Racine.

W. W. Nichols, assistant to president Allis-Chalmers Mfg. Co., Milwaukee.

New Fluorspar Company Organized

Interests at Youngstown, Ohio, have organized the Klondike Fluorspar Corporation, incorporated under the laws of Delaware, to take over the property in Livingston County, Ky., formerly controlled by the Ohio-Kentucky Fluorspar & Lead Corporation. The new company owns about 2½ sq. miles of property, with a concentrating mill and mine equipment. Principal offices are maintained at Youngstown, and it is planned to operate the mine this year. C. W. Danforth is president of the company, Victor Olson is vice-president and treasurer, Joseph Vogelberger, vice-president, and Mary N. Canfield, secretary.

Pfaff & Bathke, Pioneer Building, St. Paul, Minn., have been appointed sales representatives in Minnesota for the Trumbull Steel Co., Warren, Ohio.

Most Recent Developments in the Tools of Industry to be Assembled Under One Roof in Cleveland

FOR the first time in the history of the American machine tool trade, the exposition to be held in Cleveland the week of Monday, Sept. 19, will present in an all-inclusive way the most outstanding accomplishments in "The Master Tools of Industry." There will be 174 exhibitors and their machines on display will bring together under one roof most of the results designers have been striving for in recent years in the direction of maximum production and low unit costs in the manufacture of products from metal. Literally it will be a $1,000,000 machine shop, most of it in operation. Known as the National Machine Tool Exposition, it is sponsored and managed by the National Machine Tool Builders' Association.

Many of the machine tools to be shown have never before been exhibited. In some cases the models are so recent that no announcements regarding their features have been made. The exhibits will include many high-production units of new design as well as improved models of equipment previously known to users. Engineers and others of the staffs of machine tool companies will be on hand to explain features of construction and operation, also to give information on the definite production and financial economies that may be expected from the equipment shown.

Because of the quantity, variety and high character of the exhibits, this exposition will afford users an unusual opportunity to compare the status of their own production equipment with the new standards set by machine tool engineers. It is safe to predict that the exposition will be taken as fresh evidence that machine tool builders generally are highly responsive to the continuing demand for the lowering of production costs in the metalworking industries.

Admission to the exposition hall is free to everyone interested. No invitation is required, nor will tickets be furnished, but every visitor will be asked to register. Nearly all of the large manufacturing companies in the country have made known their intentions to send one or more of their technical men. Visitors are also coming from Europe, Canada and the Latin-American countries.

Some of the machines to be exhibited are briefly described and illustrated in following pages. A complete list of the exhibiting companies, with enumeration of products to be shown and names of representatives in attendance, is also given. More extensive editorial treatment of the new and improved machines will be given in subsequent issues of THE IRON AGE.

Exhibitors and Products to be Shown at Machine Tool Exposition

Abrasive Machine Tool Co., East Providence, R. I.
No. 3 surface grinder, motor driven, with exhaust attachment and magnetic chuck; No. 13 vertical-spindle surface grinder with rotary table, motor driven and equipped with rotary magnetic chuck; No. 5 surface grinder, motor driven, exhaust attachment, magnetic chuck, and generator. In attendance: Frank N. MacLeod, Norman D. MacLeod, C. Gordon MacLeod, Kenneth B. MacLeod, Harry H. Flint, Walter Sceeles.

Acme Machinery Co., Cleveland.
All steel heading machine; double bolt cutter; semi-automatic nut tapper; nutting up machine; die grinder. In attendance: H. N. Anderson, A. C. Knauer, D. R. Davies, M. W. Lamprecht, H. R. Akers, C. E. Smith.

Acme Machine Tool Co., Cincinnati.
Universal Cincinnati Acme turret lathe. In attendance: Charles Meier, Fred Winkelman, L. Leon, Howard Myers.

Ahlberg Bearing Co., Chicago.
CJ B Master ball bearings, single and double row, also self-alining; Ahlberg ground bearings; thrust bearings. In attendance: C. J. Bender, B. S. Okner, F. W. Meile, B. B. Clark, P. P. Bender, P. F. McGuinn, F. O. Burkholder.

Charles G. Allen Co., Barre, Mass.
Ball bearing drilling and tapping machines; a 4-spindle machine with power feed on all spindles in operation drilling valve heads; a 2-spindle machine, one spindle being a new combination cam feed and power feed type and the other spindle a new tapping and drilling top column; a 4-spindle combination machine, one top column being a super speed top column, one being a regular hand feed column, one being a hand feed top column with tapping device built on spindle nose and the fourth spindle being one of company's wide belt type power feed top columns. In attendance: Charles G. Allen, John S. Weeks.

American Tool Works Co., Cincinnati.
American lathes, shapers, radial drills. In attendance: J. B. Doan, J. C. Russey, H. W. Schatz, F. L. Stube, A. H. Koller.

Anderson Brothers Mfg. Co., Rockford, Ill.
Anderson electric power scraper machine for scraping flat bearings; Anderson hand scraper for scraping flat bearings; Anderson improved balancing ways for balancing fly wheels, pulleys, etc. In attendance: Swan F. Anderson, G. A. Larson, G. H. Garrison.

Associated Machine Tool Dealers, Cleveland.
In attendance: J. R. VanDyck, Charles B. Bush, George Cherington, Tyler W. Carlisle.

Avey Drilling Machine Co., Cincinnati.
Single-spindle No. ½ belted motor Avey high-speed ball bearing drilling machine with cam feed and automatic rotating fixture, new design, first time shown; single-spindle No. ½ heavy motor Avey high-speed ball bearing drilling machine, new design, first time shown; No. 2 belted motor tool room drill, new design, first time shown; single-spindle No. 2 motor Avey ball bearing drilling machine, new design; single-spindle No. 3 motor Avey ball bearing drilling machine with standard motor unit on table, new design and special application of standard equipment; special application of standard Avey motor unit; two-spindle No. ½ motor driven Avey high-speed ball bearing drilling machine with tapping attachment; two-spindle No. 2 motor driven Avey drilling machine, one-spindle with Aveymatic feed, the other with tapping unit; three-spindle No. 3 motor driven Avey drilling machine with speed reducer, one Aveymatic feed and one tapping head; 6-in. Avey Milband cutting saw, improved design. In attendance: L. B. Patterson, J. G. Hey, J. F. Merrielees, D. A. Patterson, F. L. Hazledine, G. M. Galt.

Baker Brothers, Inc., Toledo, Ohio.
No. 121 Baker light heavy duty drilling machine; No. 25 hydraulic boring and drilling machine (single spindle); No. 25 hydraulic boring and drilling machine (5-spindle

(*Continued on page 764*)

Co., Cleveland, electric motors; Stanley Belting Corporation, New York, new Larson belt lacing machine; and the L. J. Wing Mfg. Co., New York, ventilating and unit heating devices.

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The committee of One Hundred includes the following:

C. M. Jesperson, treasurer Southern Manganese Corporation, Anniston, Ala.

Julius Goslin, president Joubert & Goslin Machine & Foundry Co., Birmingham.

Constant Meese, 500 Lake Park Boulevard, Oakland, Cal.

E. J. Yetter, president Western Elaterite Roofing Co., Denver.

F. S. Chase, president Chase Companies, Waterbury, Conn.

Willis F. Hobbs, president Bridgeport Hardware Mfg. Co., Bridgeport.

Clarence E. Whitney, president Whitney Mfg. Co., Hartford.

C. A. Dunham, president C. A. Dunham Co., Chicago.

Robert P. Lamont, president American Steel Foundries, Chicago.

William Butterworth, Deere & Co., Moline, Ill.

E. B. Leigh, president Chicago Railway Equipment Co., Chicago.

C. H. Markham, chairman of the board, Illinois Central System, Chicago.

A. H. Mulliken, president Pettibone Mulliken Co., Chicago.

W. B. Storey, president Atchison, Topeka and Santa Fe Railroad, Chicago.

H. C. Atkins, president E. C. Atkins & Co., Indianapolis.

S. D. Bechtel, president S. F. Bowser & Co., Fort Wayne.

Clifford S. Anderson, Norton Co., Worcester.

H. C. Beaver, treasurer Rolls-Royce Co. of America, Springfield, Mass.

R. E. Thompson, vice-president Gillette Safety Razor Co., Boston.

Thomas M. Simpson, secretary Continental Motors Corporation, Detroit.

John Trix, president American Injector Co., Detroit.

A. T. Waterfall, vice-president Dodge Brothers Co., Detroit.

H. I. Finch, president Emerson Electric Mfg. Co., St. Louis.

Henry Abbott, president Calculagraph Co., New York.

William H. Barr, president W. H. Barr, Inc., Buffalo.

N. J. Gould, president Goulds Pumps, Inc., Seneca Falls, N. Y.

Carl Hallauer, Bausch & Lomb Optical Co., Rochester.

E. M. Herr, president Westinghouse Electric & Mfg. Co., New York.

E. F. Loomis, president Lehigh Valley Railroad, New York.

F. L. Morse, president Morse Chain Co., Ithaca, N. Y.

W. A. Anderson, John A. Roebling's Sons Co., Trenton, N. J.

William A. D. Evans, president Cooper-Hewitt Electric Co., Hoboken, N. J.

Enos Paullin, secretary Ferracute Machine Co., Bridgeton, N. J.

S. P. Bush, president Buckeye Steel Castings Co., Columbus, Ohio.

Frank Collins, executive vice-president National Supply Co., Toledo.

F. R. Fishback, president Electric Controller & Mfg. Co., Cleveland.

P. O. Geier, Cincinnati Milling Machine Co., Cincinnati.

Henry Howard, Grasselli Chemical Co., Cleveland.

Charles B. King, vice-president Marion Steam Shovel Co., Marion, Ohio.

John F. Ohmer, president Ohmer Fare Register Co., Dayton.

George M. Verity, president American Rolling Mill Co., Middletown, Ohio.

C. W. Asbury, vice-president Enterprise Mfg. Co., Philadelphia.

W. W. Atterbury, president Pennsylvania Railroad Co., Philadelphia.

Frank Disston, president Henry Disston & Sons, Inc., Philadelphia.

A. L. Humphrey, president Westinghouse Air Brake Co., Pittsburgh.

George L. Markland, Jr., chairman of the board, Philadelphia Gear Works, Philadelphia.

Staunton B. Peck, vice-president Link-Belt Co., Philadelphia.

Henry D. Sharpe, treasurer Brown & Sharpe Mfg. Co., Providence, R. I.

I. B. Merriam, president-treasurer Chattanooga Boiler & Tank Co., Chattanooga.

E. H. Sholar, president Chattanooga Implement and Mfg. Co., Chattanooga.

W. W. Coleman, president Bucyrus Co., South Milwaukee, Wis.

E. J. Harvey, president Harvey Spring & Forging Co., Racine.

W. W. Nichols, assistant to president Allis-Chalmers Mfg. Co., Milwaukee.

New Fluorspar Company Organized

Interests at Youngstown, Ohio, have organized the Klondike Fluorspar Corporation, incorporated under the laws of Delaware, to take over the property in Livingston County, Ky., formerly controlled by the Ohio-Kentucky Fluorspar & Lead Corporation. The new company owns about 2½ sq. miles of property, with a concentrating mill and mine equipment. Principal offices are maintained at Youngstown, and it is planned to operate the mine this year. C. W. Danforth is president of the company, Victor Olson is vice-president and treasurer, Joseph Vogelberger, vice-president, and Mary N. Canfield, secretary.

Pfaff & Bathke, Pioneer Building, St. Paul, Minn., have been appointed sales representatives in Minnesota for the Trumbull Steel Co., Warren, Ohio.

Most Recent Developments in the Tools of Industry to be Assembled Under One Roof in Cleveland

FOR the first time in the history of the American machine tool trade, the exposition to be held in Cleveland the week of Monday, Sept. 19, will present in an all-inclusive way the most outstanding accomplishments in "The Master Tools of Industry." There will be 174 exhibitors and their machines on display will bring together under one roof most of the results designers have been striving for in recent years in the direction of maximum production and low unit costs in the manufacture of products from metal. Literally it will be a $1,000,000 machine shop, most of it in operation. Known as the National Machine Tool Exposition, it is sponsored and managed by the National Machine Tool Builders' Association.

Many of the machine tools to be shown have never before been exhibited. In some cases the models are so recent that no announcements regarding their features have been made. The exhibits will include many high-production units of new design as well as improved models of equipment previously known to users. Engineers and others of the staffs of machine tool companies will be on hand to explain features of construction and operation, also to give information on the definite production and financial economies that may be expected from the equipment shown.

Because of the quantity, variety and high character of the exhibits, this exposition will afford users an unusual opportunity to compare the status of their own production equipment with the new standards set by machine tool engineers. It is safe to predict that the exposition will be taken as fresh evidence that machine tool builders generally are highly responsive to the continuing demand for the lowering of production costs in the metalworking industries.

Admission to the exposition hall is free to everyone interested. No invitation is required, nor will tickets be furnished, but every visitor will be asked to register. Nearly all of the large manufacturing companies in the country have made known their intentions to send one or more of their technical men. Visitors are also coming from Europe, Canada and the Latin-American countries.

Some of the machines to be exhibited are briefly described and illustrated in following pages. A complete list of the exhibiting companies, with enumeration of products to be shown and names of representatives in attendance, is also given. More extensive editorial treatment of the new and improved machines will be given in subsequent issues of THE IRON AGE.

Exhibitors and Products to be Shown at Machine Tool Exposition

Abrasive Machine Tool Co., East Providence, R. I.
No. 3 surface grinder, motor driven, with exhaust attachment and magnetic chuck; No. 13 vertical-spindle surface grinder with rotary table, motor driven and equipped with rotary magnetic chuck; No. 5 surface grinder, motor driven, exhaust attachment, magnetic chuck, and generator. In attendance: Frank N. MacLeod, Norman D. MacLeod, C. Gordon MacLeod, Kenneth B. MacLeod, Harry H. Flint, Walter Sceeles.

Acme Machinery Co., Cleveland.
All steel heading machine; double bolt cutter; semi-automatic nut tapper; nutting up machine; die grinder. In attendance: H. N. Anderson, A. C. Knauer, D. R. Davies, M. W. Lamprecht, H. R. Akers, C. E. Smith.

Acme Machine Tool Co., Cincinnati.
Universal Cincinnati Acme turret lathe. In attendance: Charles Meier, Fred Winkelman, L. Leon, Howard Myers.

Ahlberg Bearing Co., Chicago.
CJ B Master ball bearings, single and double row, also self-alining; Ahlberg ground bearings; thrust bearings. In attendance: C. J. Bender, B. S. Okner, F. W. Meile, B. B. Clark, P. P. Bender, P. F. McGuinn, F. O. Burkholder.

Charles G. Allen Co., Barre, Mass.
Ball bearing drilling and tapping machines; a 4-spindle machine with power feed on all spindles in operation drilling valve heads; a 2-spindle machine, one spindle being a new combination cam feed and power feed type and the other spindle a new tapping and drilling top column; a 4-spindle combination machine, one top column being a super speed top column, one being a regular hand feed column, one being a hand feed top column with tapping device built on spindle nose and the fourth spindle being one of company's wide belt type power feed top columns. In attendance: Charles G. Allen, John S. Weeks.

American Tool Works Co., Cincinnati.
American lathes, shapers, radial drills. In attendance: J. B. Doan, J. C. Russey, H. W. Schatz, F. L. Stuhe, A. H. Koller.

Anderson Brothers Mfg. Co., Rockford, Ill.
Anderson electric power scraper machine for scraping flat bearings; Anderson hand scraper for scraping flat bearings; Anderson improved balancing ways for balancing fly wheels, pulleys, etc. In attendance: Swan F. Anderson, G. A. Larson, G. H. Garrison.

Associated Machine Tool Dealers, Cleveland.
In attendance: J. R. VanDyck, Charles B. Bush, George Cherington, Tyler W. Carlisle.

Avey Drilling Machine Co., Cincinnati.
Single-spindle No. ½ belted motor Avey high-speed ball bearing drilling machine with cam feed and automatic rotating fixture, new design, first time shown; single-spindle No. ½ heavy motor Avey high-speed ball bearing drilling machine, new design, first time shown; No. 2 belted motor tool room drill, new design, first time shown; single-spindle No. 2 motor Avey ball bearing drilling machine, new design; single-spindle No. 3 motor Avey ball bearing drilling machine with standard motor unit on table, new design and special application of standard equipment; special application of standard Avey motor unit; two-spindle No. ½ motor driven Avey high-speed ball bearing drilling machine with tapping attachment; two-spindle No. 2 motor driven Avey drilling machine, one-spindle with Aveymatic feed, the other with tapping unit; three-spindle No. 3 motor driven Avey drilling machine with speed reducer, one Aveymatic feed and one tapping head; 6-in. Avey Miiband cutting saw, improved design. In attendance: L. B. Patterson, J. G. Hey, J. F. Merrielees, D. A. Patterson, F. L. Hazledine, G. M. Galt.

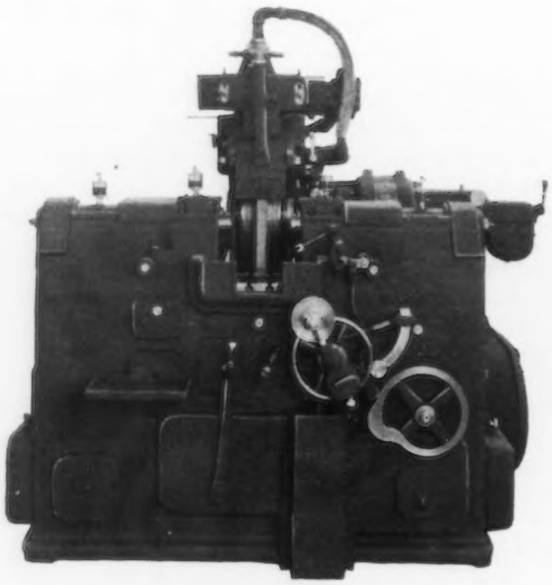
Baker Brothers, Inc., Toledo, Ohio.
No. 121 Baker light heavy duty drilling machine; No. 25 hydraulic boring and drilling machine (single spindle); No. 25 hydraulic boring and drilling machine (5-spindle

(*Continued on page* 764)

Full Automatic Grinding Machine for Work Up to 4-In.

WORK up to 4 in. in diameter and 5 in. in length may be ground on a high production basis on the full automatic grinding machine illustrated, which is one of the new items to be demonstrated by the Norton Co., Worcester, Mass. Uniformity in accuracy and finish requirements were also basic considerations in developing the machine, which is designated as the type B. The grinding wheel unit is of the company's standard 10 in. type B construction.

The front section of the machine is of new design. Positive gear drive and cam actions control the cycle of operations from the automatic loading of the work on the live centers to its ejection when finished. The work revolutions and rate of infeed of the wheel are timed to suit each job. The length of dwell at the end of the cut can be changed to permit sizing and finishing to various requirements. The work is placed in a feeder and then delivered between the centers by a mechanically-operated loader of the turret type. Upon completion of the grinding cut and dwell the centers are withdrawn to permit the turret to carry out the finished piece and insert the next for grinding.

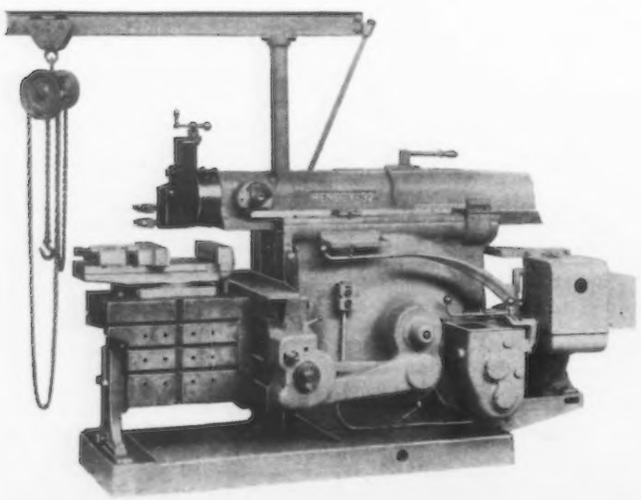


The wheel truing device, located in the wheel guard, has a power driven traverse motion assuring uniformity of traverse. Formed surfaces may be ground by truing the wheel face to a negative of the form desired. This is accomplished by using a form bar in the truing device to control the path of the diamond. On straight work a wheel spindle reciprocating attachment is used, this being said to preserve the life of the wheel face and to improve the quality of finish. Because of the automatic features, several of the machines can be tended by one operator after being set up for a grinding job.

A New 32-In. Crank Shaper

IN addition to two of its lathes, and a 16-in. shaper with universal table, the Hendey Machine Co., Torrington, Conn., will show a new 32-in. crank shaper, in which every part has been especially designed for the heavier work which a machine of this size is called upon to perform. It is provided with equipment which aims for a high production with accuracy.

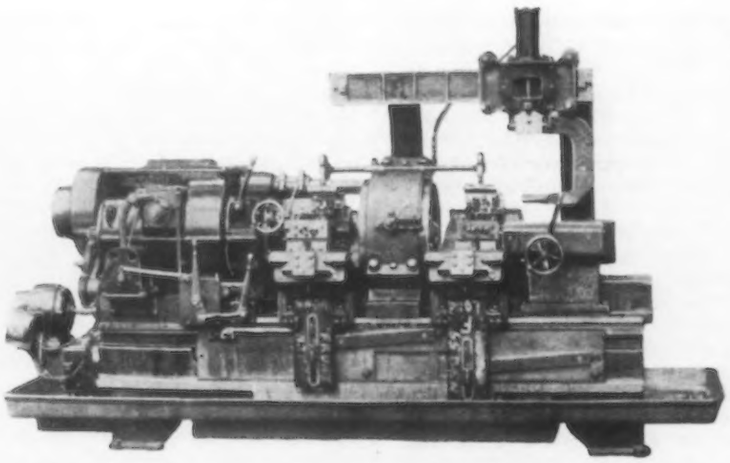
The driving mechanism is constructed as a unit. The gear speed box, which is bolted to the right side of the column, carries two alloy steel shafts which run in ball or roller bearings, and on these shafts are mounted eight alloy steel hardened speed change gears, which give four speed changes. These shafts extend into the column and carry the back gearing, with one shaft following through into engagement with the driving pulley or sprocket. Power transmission from pulley to shaft is through the company's patented combined friction clutch and brake, controlled and operated by a long horizontal lever extending to the front of the machine. The friction clutch is of the self-energizing type, which is said to react against slippage by increasing the driving capacity. The ram gib and cap are cast in one piece, as in previous models of the company's shapers. The entire driving mechanism is lubricated automatically.



The stroke range of the shaper, with driving pulley running at 550 r.p.m., is from 7 to 107 per min. through a series of eight speeds. The hand crank used for changing the length of stroke is applied to the end of the adjusting shaft, which operation automatically releases the shaft lock, enabling the operator to make the desired stroke change. The removal of the crank likewise automatically clamps the shaft in position. The cross feed takes place on the reverse stroke only, and is of the slow motion type. All feed changes are made at the end of the cross rail by a double handle crank controlling a link motion. The amount of feed can be changed while the machine is in motion. A large diameter dial gives the feed changes in thousandths, the range being 0.1010 to 0.150 in. A constant-speed motor of either 10 or 15 hp. is used, depending on the class of work to be done.

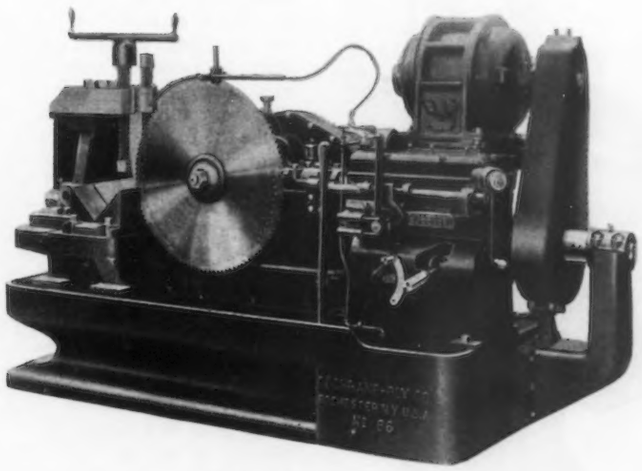
Center-Drive Automatic Crankshaft Lathe

ONE item of new equipment to be demonstrated by the R. K. LeBlond Machine Tool Co., Cincinnati, is the center-drive automatic crankshaft lathe illustrated, which will be tooled up for forming simultaneously the stub and flange end bearings of the Buick Master Six crankshaft. This machine eliminates the necessity for the separate machines used heretofore for these end bearings. The front and rear tools feed together simultaneously and form the bearings to the rough grinding size. The machine will be provided with an air-operated loading device which greatly simplifies the placing of the crank between centers.



The company's 16-in. geared-head rapid production lathe, having a selective speed geared headstock equipped with Timken bearings on all shafts and the main spindle, will also be in operation, as well as a 15-in. precision tool room lathe with a newly developed full universal relieving attachment. This is adaptable to side relief, end, angular and internal relief, and can be used in connection with the taper attachment.

Metal Sawing Machine with Three Cutting Speeds



THREE cutting speeds, 45, 60 and 75 ft. per min., are provided on the improved metal sawing machine, designated as the No. 66, which will be exhibited by the Cochrane-Bly Co., Rochester, N. Y. This machine has a back gear shaft mounting the worm, fully inclosed in the carriage with the worm gear and spur drive gear, and running in a bath of oil. The speed changes are made by means of sliding gears of nickel steel, hardened. The drive shaft runs in ring-oiling bearings, and the friction clutch hub is provided with self-oiling bushing. The reservoir for oil holds a sufficient supply for several weeks. The feeds provided range from ¾ in. up to approximately 9 in. per min.

Surface Grinder with Hydraulic Feed

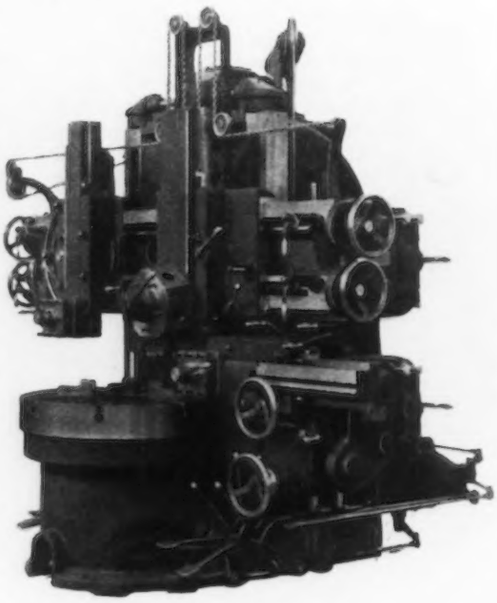
OILGEAR hydraulic feed is a feature of the No. 4 surface grinder which will be demonstrated by the Gallmeyer & Livingston Co., Grand Rapids, Mich. In this machine all gearing for the movement of the saddle and table has been eliminated and the hydraulic feed employed. A wide range of feed, from zero to 55 ft. per min., is now available simply by manipulation of the handle at the front of the base. At each reversal of the table the Oilgear actuates the cross-feed mechanism and it may be set to operate at each end of the reciprocating table stroke or at one end only, and to feed in or out. The amount of cross feed for each reciprocation of the table is also adjustable.

Another feature of the machine is the method of raising and lowering the wheel head. For rapid adjustment, used in raising and lowering a considerable distance, the large hand-wheel is used. For grinding to close limits, a fine adjustment is provided. The standard spindle construction provides for carrying wheels 10 in. in diameter, either ¾- or 1-in. face. Equipment for wet grinding can be furnished.

Heavy-Duty Vertical Boring and Turning Machine

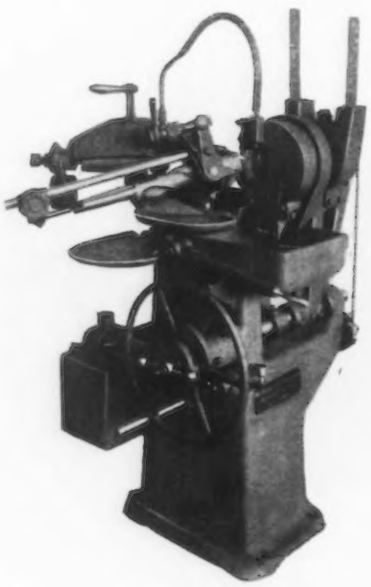
AN improved heavy-duty vertical boring and turning machine, with side head, will be exhibited by the King Machine Tool Co., Cincinnati. It departs from the company's standard machine principally in the construction of the feed and drive mechanisms. Gears in the drive are of steel, pinions are of alloy-steel, heat-treated, and the shafts have been increased in diameter to enable them to transmit the greater carrying capacity of the gears. To reduce wear to a minimum the dimensions of the gears are as large in steel as formerly was the practice in cast iron. A multiple-disk friction clutch is used for engaging the drive and when disengaged a brake functions to bring the table to rest. Two treadles are employed, these being placed on both sides of the machine when two rail heads are furnished, one for starting the table and the other for stopping it. These treadles are arranged so that when one is pushed down the other comes up, thereby eliminating confusion on the operator's part as to what to do when the table is either to be stopped or started.

Other features include automatic lubrication of the drive mechanism, 16 table speeds, and concentration of the feed mechanisms, which are independent for each head, in boxes bolted to each end of the rail. Shafts in the feed mechanism are mounted on ball bearings and lubrication is by the splash system. A screw cutting attachment may be furnished. The machine is available in 30, 42, 52, 62, 72, 84 and 96-in. sizes.



Improved Drill Grinding Machine

AMONG the machines shown by William Sellers & Co., Inc., Philadelphia, will be an improved drill grinding machine, designated as the No. 2A. This machine is intended for grinding two-lip, flat and twist drills from 5/16 to 3 in. in diameter, but with special jaws three-lip drills from ¾ to 2 9/16 in. in diameter may be ground. The emery wheel spindle of the improved machine is of high-carbon steel and is ground. It runs in hard bronze bearings which may be conveniently adjusted. A cast-iron wheel guard deflects the water into the pan without splash. The swing frame for the emery wheel spindle is now separate from the tank, which facilitates moving. The chuck, also improved, swings on forged steel centers, one of which is adjustable. It is balanced by counterweights which may be set for different sizes of drills, this feature being of special value where large numbers of the same sized drills are to be ground. In the new machine the pump is at the back of the machine and may be removed conveniently for cleaning. Either belt or motor drive arrangement can be furnished. In the motor driven unit (not illustrated) the motor, belt and pulley are inclosed in a box, the contents of which are conveniently accessible for inspection.



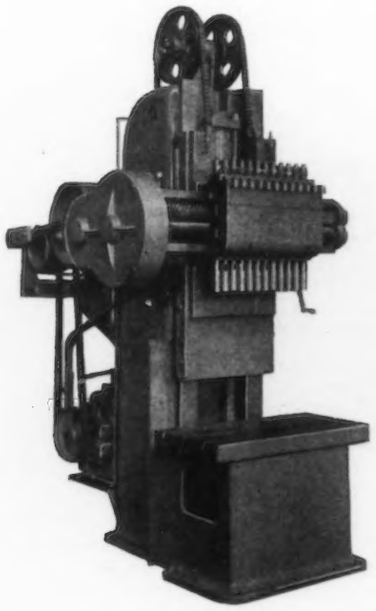
The Sellers company also plans to exhibit a new type K, 36 in. by 36 in. planer, which combines the established basic principles of Sellers planers with improvements such as power traverse, dial feed, centralized lubrication, single lever cross-head locking device, etc. Simplicity of design and convenient accessibility are general features of this machine, which will be illustrated in a forthcoming issue of THE IRON AGE.

Metal Saw Equipped with Screw Feed

POSITIVE acting screw feed is the feature stressed by the Racine Tool & Machine Co., Racine, Wis., in connection with the reciprocating metal saw illustrated, which is designated as the new "Shear Cut" production saw. The feed mechanism may be set at any desired rate from less than 0.001 in. to more than 0.025 in. per stroke. It is stated that the ability of the blade to cut through solid bar steel without any provision for the life of the blade, or providing any yielding in the pressure, is due to the fact that the feed is distributed uniformly throughout the entire length of the cutting stroke. It is claimed that the teeth wear uniformly, without concentrated load at any one point.

This machine is built in sizes to handle 4-in. and 6-in. stock. A new three-speed transmission having selective sliding gears is mounted on the rear, the drive to the main shaft being from a roller steel chain. Power is had either from belt or motor to a worm gear, which furnishes proper speed reduction.

Drilling Machine with Oilgear Feed



AN addition to its line of Hole Hog machines, the No. 115-D driller will be introduced by the Moline Tool Co., Moline, Ill. The box section column of this machine extends from floor to top, with guides running its full length. The column is provided with wings to which the base is bolted. As the base is U-shaped, it does not interfere with the slide. The slide has a narrow guide on the column and is provided with tapered gibs to permit easy and positive adjustment.

Drive spirals and spindle heads are carried by a rail bolted to the slide and capable of being placed at varying heights with respect to the table. The drive is from a motor belted to a pulley on the auxiliary shaft mounted on the rail. Pick-off gears in the gear case provide speed changes. The same motor which drives the machine drives also an Oilgear feed pump. The cylinder, 5⅛ in. x 24 in., is mounted on the front and center of the column and arranged for giving the greatest pressure to the working stroke. The stroke is controlled by a single lever at the right of the machine. The cycle of operations is automatic. The illustration shows a machine equipped with twelve 2-in. heads on the rail. The minimum center distance with this size is 2 in. and the maximum center distance 40 in. This 115-D machine supersedes several different sizes and types of the company's present line, particularly the machines used for valve machining.

Small Parts Milled by Offset Process

A TILTED offset milling machine for production face or straddle milling of small parts, milling of slots, and making saw cuts will be in operation at the booth of the Oesterlein Machine Co., Cincinnati. The production advantage of the offset process is attributed to the fact that a number of parts are under cut simultaneously. The machine has a tilted circular table with a large center hole. The spindle is mounted beneath and at right angles to the work on the table. Mounting the spindle, below the table, is said to bring the drive as close as possible to the spindle nose and to permit removal of the arbors or cutters without disturbing the vertical setting. A 4-in. offset adjustment is provided for the table so that the center line

of the table and that of the spindle may coincide for the removal of the circular or hollow circular work-holding section, or may be offset the difference required to obtain the proper depth of cut. The spindle is mounted in a slide which is bolted to the housing that carries the table and the outboard support for the arbor. The spindle may be adjusted vertically so that the cutters may be set in proper relation to the work. The machine swings work up to 48 in. in diameter and takes 14 in. high between the table and the top of the housing. The table is 30 in. in diameter and is mounted in a tilted position in order to shed the coolant and wash the chips into a cavity in the base of the machine. The drive is by means of a 10-hp. motor.

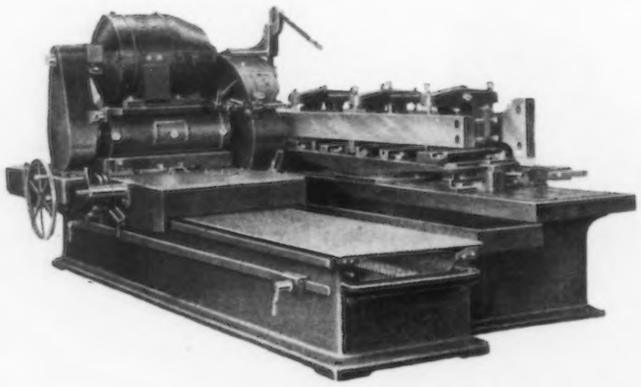
System for Controlling the Size of Reamed Holes

IN sharpening reamers for service that requires fine finish and accuracy, it is usually necessary to stone the reamer cutting edges by hand. This hand operation not only introduces the personal equation but consumes time. The Barber-Colman Co., Rockford, Ill., in its exhibit, will demonstrate a system, combining reamers and a sharpening machine, which is intended to eliminate the hand operation and to assure high finish and accuracy. The reamers are designed to be in step with the machine during the process of sharpening, therefore one cannot be used without the other.

It is stated that study of accumulated data covering the amount of diameter cutting clearance, the form of nose, etc., most suitable for cutting materials of various hardness, as well as study of other variables met with in different classes of reaming, has made it possible to furnish reamers best suited for their particular work. The reamer and the reamer sharpener are said to be so tied together that it is possible to hold all reamer dimensions to the close limits required by the job at hand. The sharpening of the reamers is under mechanical control, the machine for this work being illustrated above.

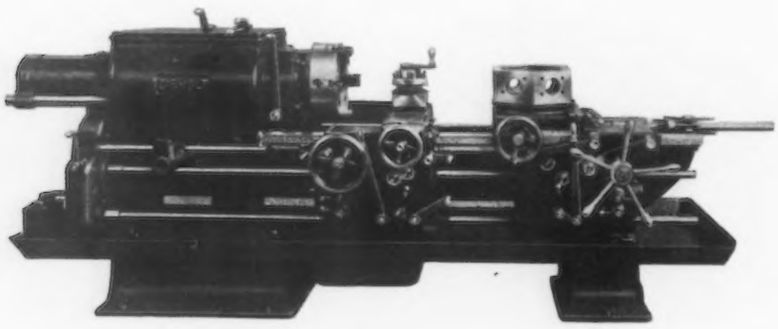
Locomotive Guide Bar Grinder

EQUIPMENT for grinding locomotive guide bars, production being facilitated by means of a swiveling work-holding device, will be exhibited by the Machinery Co. of America, Big Rapids, Mich. The grinding unit is of the traveling grinding wheel, stationary work-table type and has capacity for work up to 84 in. long and 24 in. high. Savings in floor space as well as in power are claimed for this type machine. The swiveling work holder for the locomotive guide bars is arranged so that one piece of work can be set up while another is being ground, the grinding operation being continuous. The guide bar holder is arranged so that the second set-up can be adjusted to any position or angle desired with the aid of gages provided, further adjustments being unnecessary after the device is swung into position. Cross feed is by hand wheel at the front of the machine. Feed changes may be made at the front or the back, also power quick return of the wheel to or from the work, and start and reverse of the carriage. The grinding wheel is 30 in. in diameter and is of segmental block type held in a chuck. Wheel speeds range from 450 to 500 r.p.m. and the carriage may be fed at 12, 17 or 24 ft. per min. Feeds range from 0.0005 to 0.005 in. The wheel is driven by a 25-hp. motor through silent chain.



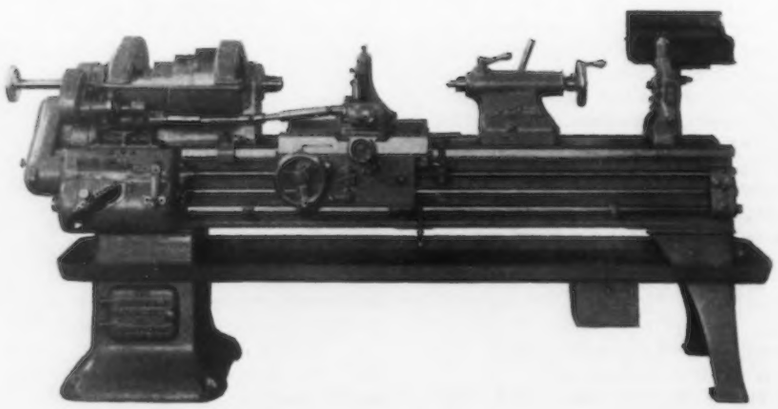
Turret Lathe for Medium Sized Work

BAR stock up to 3½ in. or chucking work up to 16 in. diameter can be accommodated on the new 2L turret lathe of the Gisholt Machine Co., Madison, Wis., which will be demonstrated in operation. The full universal two-carriage principle of the company's previous turret lathe has been incorporated and a fixed center turret is optional equipment. Massive construction is a feature. Power is transmitted from a single driving pulley through a multiple-disk clutch which runs in oil. There are 12 speed changes and reverse, accomplished by means of sliding gears on splined shaft. The spindle is mounted in cylindrical babbitt bearings, in tapered cast-iron shells. All other power transmitting shafts, including those in the apron, are mounted in ball bearings. There is a total of 16 feeds, and a rapid traverse is provided for the longitudinal movement of the side carriage, the turret carriage and for the in-and-out movements of the slide turret on the cross slide. The flat ways of the machine are covered with hardened steel plates and lubrication is by force feed through the bottom of the two slides. The machine is driven by a 10-hp. motor.



Tool Room Lathe

A TOOL room lathe, 16 in. x 8 ft., with a four-step cone and single back gears, will be displayed by the Springfield Machine Tool Co., Springfield, Ohio. The rapid-change gear device gives thirty-six changes of threads and feeds. The machine is equipped with reversing mechanism for the apron, giving right and left-hand threads and feeds, and with automatic stop in either direction. Other equipment includes a relieving attachment, taper attachment, draw-in collet attachment with a full set of collets and quick-acting tailstock.



Keyway Milling Machine for Work in Shafts Between 1½ to 18 In.

THE keyway milling machine illustrated at left, for cutting keyways in shafts from 1½ to 18 in. in diameter, will be one of the machines in operation in the space of the Ingersoll Milling Machine Co., Rockford, Ill. The machine is for shops having general keyWaying work in shafts between these sizes, particularly where the work is varied, with small quantities of any one size. Speeding up of production is attributed not only to the power and rigidity of the machine, but to the reduction of loading time afforded by the fixtures employed. The arrangement of the spindles to facilitate changing from job to job is also a feature.

The housing carries a horizontal saddle for arbor milling keyways, and a vertical saddle which is used for routing out the ends, end milling short keyways, cutting slots, etc. The horizontal saddle has power vertical feed on the housing, used for cutting the keyslots in spindle noses and similar work. Scales are set in the housing, and dial indicators may be provided for accurate adjustments. The fixtures, which consist of V-blocks and simple clamps, center the work under the vertical spindle, while the cutters in the horizontal head are centered by means of the quill adjustment. Special arbor cutters, built for the horizontal head, have housings of the same overall width, held to close limits, so that the same quill setting centers all sizes of cutters and, once set, the quill needs no adjustment when changing widths of cut.

Machine Facilitates Gear Burnishing

GEAR burnishing, designed to eliminate the personal equation in securing constant pressure, to provide a definite time of burnishing, to reverse the operations without removing the gear, and to provide quick loading and unloading facilities, will be demonstrated on one of the two machines to be exhibited by the Cincinnati Shaper Co., Cincinnati.

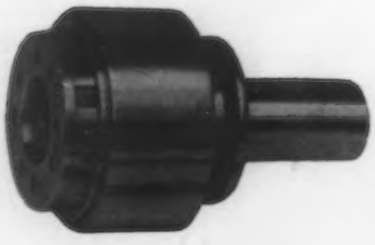
Operation is entirely automatic. The operator places the gear in position between the master gears and pushes a lever down which brings the gear into engagement with the driving burnishing gear. Throwing the control switch starts the machine in the forward direction and after it has made a predetermined number of revolutions, the spindle is reversed, making the same amount of revolutions in the other direction. Then it stops automatically.

In the machine illustrated, the carriage is in the loading position; bringing down the lever moves the carriage up into the working position. In operation, the machine requires three arbors and three master gears, one driving and two driven. The pressure with which the gear engages the burnishing gear is adjusted by raising the whole carriage by means of a crank. A micrometer collar is provided for fine adjustments.

As regularly furnished, the machine is intended for gears up to approximately 7 in. in diameter, although the machines of this type with greater swing can be arranged. The burnishing time can be varied from 5 to 6 sec. up to 30 sec. or more. A 3-hp. 1725-r.p.m. motor is used on the machine. Another exhibit by the company will be its shaper with power rapid traverse to the table.

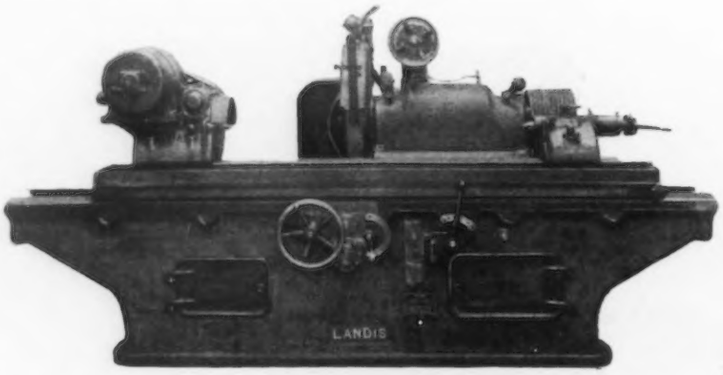
Die Head Features Improved Locking and Tripping Mechanism

THE new style EE H & G die head for use on rotating die spindles will be among the threading tools displayed by the Eastern Machine Screw Corporation, New Haven, Conn. The head is both opened and closed by means of one yoke, which engages the spool or groove in the rear of the head. Smaller outside diameter, light weight and improved locking and tripping mechanism are features. It is claimed that this head will provide accurate adjustment for the length of thread cut and because one yoke opens and closes the head, installation on automatic screw machines is simplified. The style EE head employs the same basic principle as previous H & G die heads of holding the chasers, supporting them directly over the chamfer and having the same positive opening action. It also takes the same chasers. Four sizes of the die head, from 7/16 to 1¼ in., are available.



Plain Hydraulic Grinders for Large Range of Work

ONE of its series of plain improved hydraulic-type grinders will be among the machines shown in operation by the Landis Tool Co., Waynesboro, Pa. These grinders are available in swings of 10, 14, 16, 20, 24 and 28 in., in various lengths, and with equipment to take a large range of work. They can be equipped for roll grinding; wide-wheel or plunge-cut grinding with continuous feed to the wheel-head and reciprocating spindle; crankshaft grinding; railroad work which requires a gap in the table, and all kinds of planes for form grinding. The machine shown above is the 10-in. by 52-in. plain grinder equipped with hydraulic power in-feed to the wheel-head.



Hydraulic power traverse, giving wide range of speeds to the table; large-diameter grinding wheel; massive wheel-head with large spindle bearings; and positive lubrication, are among the features retained from earlier models. The variable-flow oil pump and continuous hydraulic motor employed furnish power for traversing the carriage at speeds ranging from 12 to 300 in. per min. The headstock is driven from a self-contained motor on top of the headstock, the drive being through a Tex-rope to a worm and worm gear mounted on the faceplate. The motor is of variable-speed type and is carefully balanced to eliminate vibration. The work speed is controlled from a rheostat at the front of the machine. The grinding wheel-head is carried on Vee and flat bearings, the wheel feed being through a screw and nut mounted on the under side of the base. The spindle is driven from the end by a Tex-rope drive, which permits change of pulley to compensate for wheel wear.

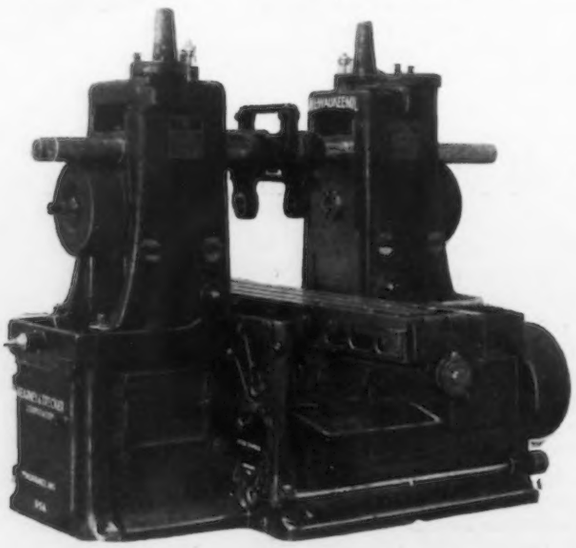
New Production Milling Machines Built On the Unit Plan

AN outstanding exhibit of the Kearney & Trecker Corporation, Milwaukee, and to be shown for the first time, will be a new production milling machine named the Mil-Waukee-Mil. Two models, the Simplex and the Duplex, illustrated, are available. The Duplex machine is identical with the Simplex with the exception of the bed, which is extended beyond the table ways for carrying a second head.

Both machines are built on the unit plan, which is emphasized as an advantage, in that the customer may order only such units as are necessary for any particular milling operation. It is stated that starting with the simple plain machine with only one set of pick-off gears, the machine can be built up by units until it becomes completely automatic, with various combinations of intermittent table feed, power rapid traverse, spindle start and stop control, etc. — including quick change feed and speed gear boxes.

Features include double housing for the spindle block, with no overhang; double overarm support for the arbor; and Timken roller bearings throughout the drive, including the main spindle. Also new planer type table; automatic flooded lubrication for the spindle bearings and all mechanism in the bed, including the table ways; and completely inclosed motor-in-bed or optional belt drive. A more complete description of the machine will be given in a forthcoming issue of THE IRON AGE.

The bed of the Duplex model is cast in one integral unit. All the mechanism within the bed is the same as in the Simplex, except that the horizontal drive shaft extends all the way through to connect with the bevel gear on the vertical drive shaft for the left-hand spindle. To the plain machines in their simplest form may be added the following interchangeable units: Complete sets of pick-off speed and feed gears; quick-change speed and feed gear boxes; automatic feed control; automatic spindle start-and-stop control; spindle reverse; and centrifugal pump and coolant system.

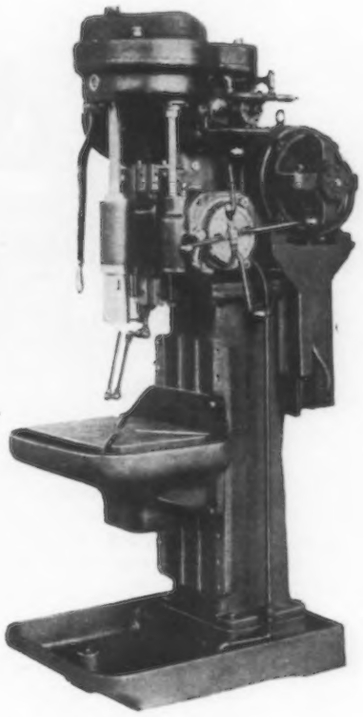


Simplicity Features New Upright Production Drill

"SINGLE-PURPOSE simplicity with general-purpose flexibility," is the brief characterization given by the Cincinnati Bickford Tool Co., Cincinnati, in connection with the 20-in. upright drilling machine pictured here, which is being exhibited by the company for the first time.

Although essentially a one-speed and one-feed machine, and stripped of all the general purpose features not used in mass-production metal machining, this machine is arranged so that any one of 16 speeds and 16 feeds can be obtained quickly, merely by transposing a few gears. Thus, speeds and feeds may be increased or reduced conveniently with changes of material, or if the particular job is discontinued, the machine can be transferred to some other production work or operation.

In this design all general purpose features not usually used in mass production, such as the speed and feed change mechanisms the friction back gears, dovetail slide



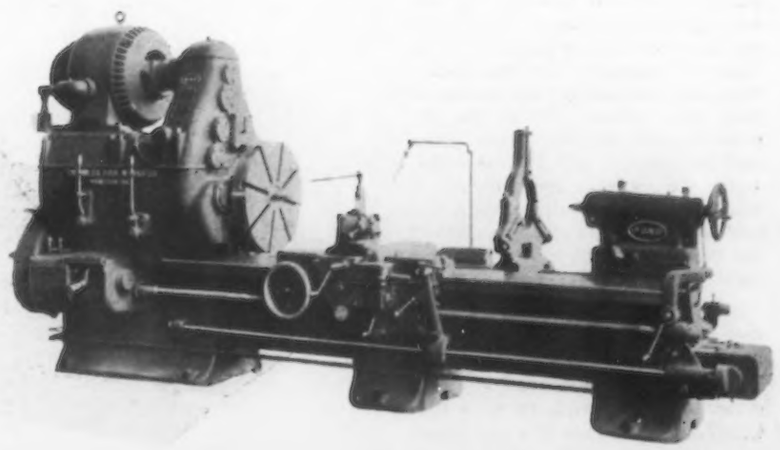
for positioning the head, the table raising and lowering mechanism, the swinging table arm, etc., have been omitted. Features include the arrangement of the forward and reverse driving clutches and the simplicity of the speed and feed gear trains. The speed gear train consists of four cluster gears of two gears each, which cluster gears are interchangeable on three vertical shafts. Sixteen gear combinations are possible giving a range of speeds from 263 to 1233 r.p.m. At each speed, there are only three gear contacts between the main driving shaft and the spindle. The feed gear train is also made up of four cluster gears of two gears each, the cluster gears being interchangeable on four vertical shafts. The 16 feeds obtainable range from 0.004 to 0.025 in. The drive is by belt or by a 5-hp. constant-speed motor. Further description of this machine, which has been named the Super Service production drill, will be included in a forthcoming issue of THE IRON AGE.

Improves Headstock, Carriage and Other Units of 27-In. Lathe

TAPERED roller bearing headstock, with solid six-spline shaft for the sliding gears; larger size drive gears; increase in range of spindle speeds; new design taper attachment; and improved carriage, with wider slides, are some of the features of the new 27-in. Pond Time-Saver lathe illustrated, which will be exhibited by the Niles Tool Works Co. division of the Niles-Bement-Pond Co., New York. The machine will be driven by a 20-hp. variable-speed D.C. motor, with a 1-hp. motor to operate the carriage, rapid power traverse and coolant pump. There are four mechanical spindle speed changes, which with the speed variations in the electrical control provide faceplate speeds ranging from 4 to 220 r.p.m. In the upper half of the headstock there are four pairs of Timken roller bearings. In the lower half, the main spindle and sliding gear shaft run on large bronze bushings. There are only six driving gears in the lower half, two of which are keyed to the spindle, the other four being the sliding gears on the spline shaft. The gears are of large proportions. Altogether there are only 12 gears in the head.

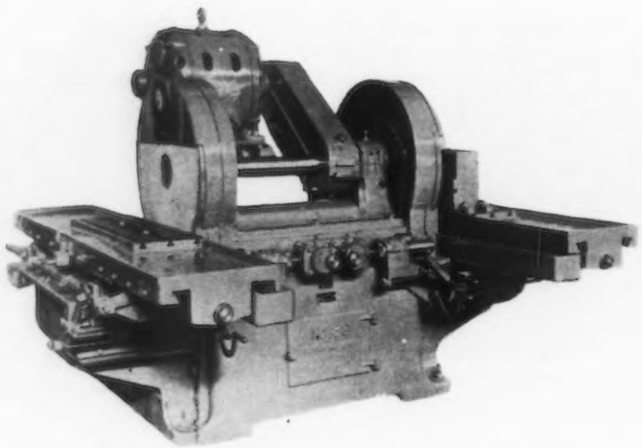
In the improved design the position of the driving motor has been reversed, the motor pinion and mating gears being located at the right-hand side or nearest the faceplate. This construction is intended to permit the use of motors of various types with frame sizes larger than usual without the disadvantage of the motor extending out toward the faceplate or chuck and obstructing the operator when setting up the work. It also permits the use of motors of higher or slower speed than nominal and of gear ratios to suit requirements.

Another feature is a jog push-button switch which permits the operator to shift gears, also to inch the faceplate or chuck by small increments when setting up or testing the work. The carriage is equipped with power rapid traverse as a regular feature. The width of the cross-slide bearing of the carriage has been increased, and the tool slide is offset 30 deg. The quick change gear box gives 32 feeds and threads, 16 additional feeds and threads being available by varying the ratio of the gears at the end of the lathe. The machine is available in three sizes, 27, 30 and 36 in., with any desired bed length. A variety of drive arrangements is available.



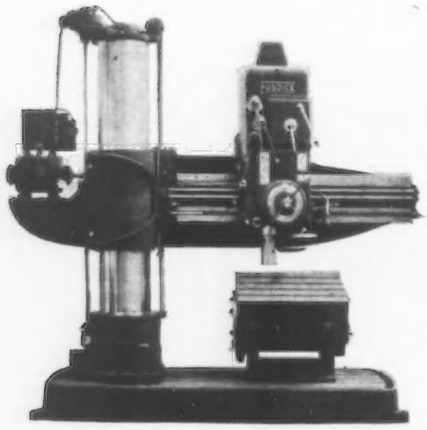
Surface Grinder with Two Hydraulically-Actuated Work Tables

A SURFACE grinder with two hydraulically-actuated work tables and one head, which supports two abrasive cutting members, will be one of the machines exhibited by the Gardner Machine Co., Beloit, Wis. The tables are arranged so that one operator can serve both of them simultaneously or alternately, depending upon the nature of the work to be ground. Both work tables are designed so that all movements are predetermined to suit the specific work, and after being set they are controlled by one hand-operated lever. All traverses of the table are produced by a hydraulic power unit, and the various traverses have full micrometer stop adjustment.



This machine, designated as the No. 89, is intended as a high production tool for a wide variety of parts having flat surfaces to be finished. It is said to be particularly adapted to the handling of pieces having two or more surfaces to be ground, but which are in such relation to each other that they cannot be finished effectively simultaneously. The abrasive members consist of 30-in. steel disk wheels, or 24-in. ring wheel carried in chucks.

Radial Drill with Control Movements Operated from Head



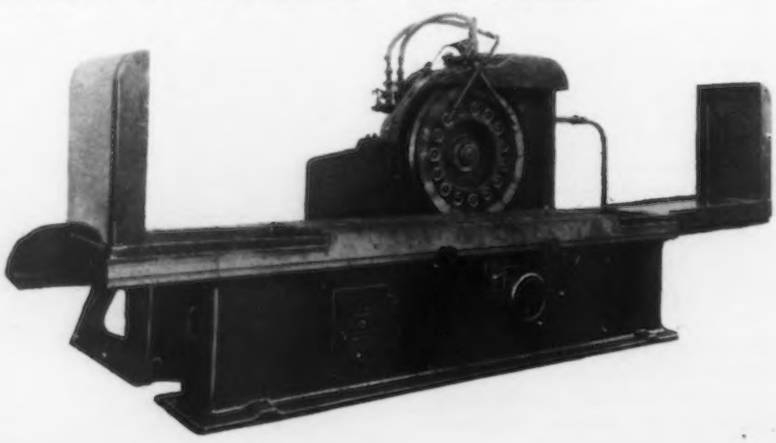
AN outstanding feature of a new line of heavy-duty radial drills, one of which will be shown by the Fosdick Machine Tool Co., Cincinnati, is the operation of all control movements from the head. The machines are available in 5, 6 and 7-ft. sizes and they are built on the unit principle. Power rapid traverse to the head is standard equipment. It is gear connected, and is arranged so that the hand wheel does not revolve when the power rapid traverse is engaged. Power column clamping, also standard equipment, is operated from the head by means of a push button. The arm clamp is interlocked.

A wide range of spindle feeds is available ranging from 14 to 1010 r.p.m. or 20 to 1406 r.p.m. Thirty-six speed changes are provided, all changes being obtained by 17 selective sliding gears through three levers. Eighteen selective feeds are obtained by means of two levers through hardened alloy steel gears of the sliding type. Speeds range from 0.003 to 0.125 revolutions of spindle and include pipe tap leads from 8-11½ and 14 threads per inch.

To Show Hydraulically-Operated Machines

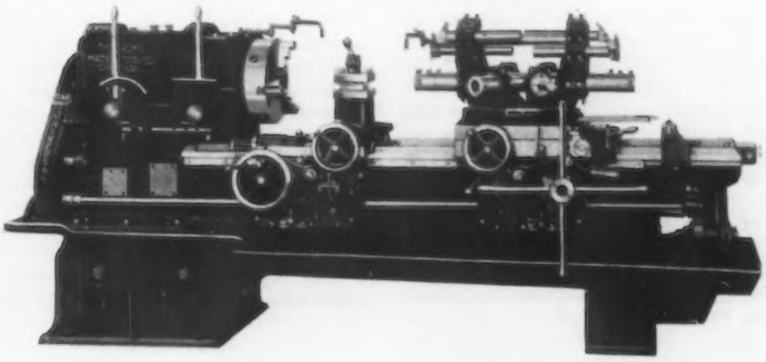
EASE of operation and unlimited gradation of table speeds up to 72 ft. per min. are features emphasized in connection with a new hydraulically-operated face-grinding machine to be exhibited by the Diamond Machine Co., Providence. Operation is through an oil motor, rack and pinion. With the hydraulic operation the table travel may be varied to suit the particular work, although the general plan of relatively low spindle speeds and fast table travel is recommended by the company as giving the best and most economical results.

A surface grinding machine, also new and hydraulically operated, will also be in operation. This machine is designed to grind either on the periphery of a disk wheel or on the face of a cup wheel. By a simple adjustment the abrasive wheel may be set to grind at any angle between vertical and horizontal. It is stated that this feature will permit grinding of V-ways and other surfaces which otherwise would have to be machined or scraped.



Heavy Type Full Universal Turret Lathe

EASE of manipulation is one of the features of a new heavy type full universal turret lathe which is being announced by the Acme Machine Tool Co., Cincinnati. The bar capacity is 4½ in. and the chuck capacity 17 in. The latter dimension is the swing over the side carriage bridge, the swing over the bed being 25 in. The length of the main turret travel is 44 in. The machine incorporates the "duo control" of the company's smaller universals, and is provided with two carriages—one for the main turret and one for the auxiliary turret.



Powerful headstock and sturdy feed transmissions are also features stressed. The geared-head single pulley drive is of multiple-splined, alloy steel, heat-treated, sliding gear type, providing nine forward and reverse spindle speeds. All changes, including stop, forward and reverse, are made through only two interlocking levers at the front of the headstock. The multiple disk clutch on the initial drive shaft is disengaged automatically when changing speeds. Transmission shafts revolve in Timken roller bearings. The driving pulley has ball-bearing outboard support at the back. Spindle end thrust is taken on a large diameter ball bearing. Cabinet leg motor drive is standard construction, the motor being mounted in the leg and the drive being either through belt or chain. Twelve independent feeds, forward and reverse, are provided in each apron.

Automatic Multiple-Spindle Production Machine

AN automatic multiple-spindle production machine of the continuous unit type for machining work held betweeen centers in a vertical position is to be shown by the Bullard Machine Tool Co., Bridgeport, Conn. In principle, the machine, known as a Contin-U-Matic center lathe, is similar to the company's six-spindle Contin-U-Matic chucking machine. There are six work spindles in a carrier and six toolheads mounted upon a hexagonal tool column built integral with the carrier. The respective spindles and toolheads always remain in direct relation to each other and form six individual units which in operation are rotated slowly around the central column. One complete cycle is required for chucking, machining and unloading a single piece, but six units operating simultaneously produce six pieces during the cycle time.

In the Contin-U-Matic center lathe a tail stock and center, mounted on the upper portion of the tool support column, may be varied in height to suit the length of work between centers. The maximum capacity, approximately 20 in. on the standard machine, may be increased when occasion requires by an extended height of the tool support column and other parts.

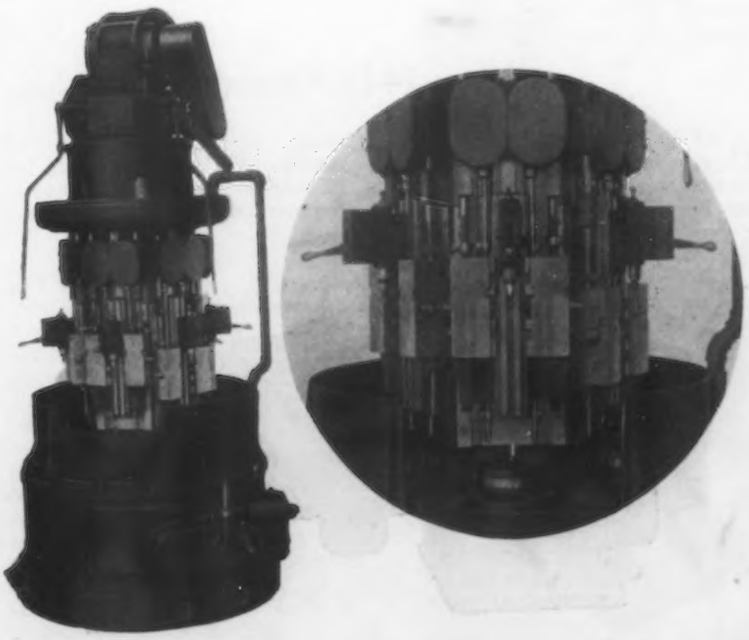
Spindle speeds available include a complete range up to a maximum of 300 r.p.m., obtained by change gears in the drive bracket. Any speed set is common to all spindles.

In diameter of work the machine has a maximum capacity of 9¼ in. swing under the tool slides and 5¼ in. maximum diameter clearance between tool slides.

All toolheads are actuated by a vertical motion from the common cam mounted at the head of the machine. This provides for a rapid advance of the heads to point of cutting, a period of feed at predetermined set rate and a rapid return, with a short dwell at the high point to permit unloading and chucking of work. Primary feed motion from this cam is transmitted through secondary speed boxes mounted on the face of the tool support column to two tool slides at either side of center, which are independent in action and independently variable in rate and length of feed stroke by relation of gears in secondary feed boxes on the face of the column.

Tool slide traverse provides for exceptional adaptability in vertical and horizontal cuts. Each slide may be independently set for either plain vertical or plain horizontal stroke, with rapid advance and with feed of predetermined rate and length. In combined motion, however, each slide will advance horizontally to the work, traverse vertically along the cut, withdraw from the work at the bottom of the stroke and return in rapid motion to its original position.

The maximum length of plain vertical stroke is somewhat over 9 in. and the maximum horizontal stroke is 1¾ in. In combined horizontal and vertical traverse the compounding requires 3.66 in. of vertical rod motion for each inch



of horizontal traverse. By deducting the amount of vertical motion necessary for the horizontal traverse required, the remainder of the maximum 9-in stroke is available for direct vertical feed of the slide. The slower horizontal tool feed is of advantage when the tool is nosing its depth into the work, but vertical feed along the cut is taken at the standard set rate.

This arrangement of tool slides in each head provides for a considerable variety of independent tool application grouped in each unit and the two independent slides of each head will therefore accommodate an extensive variety of grouped operations performed simultaneously.

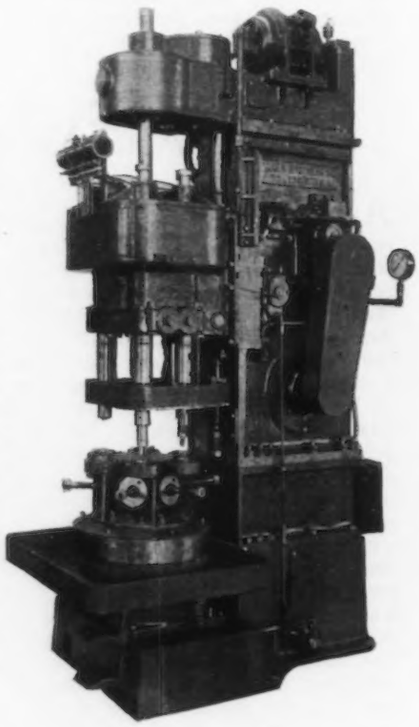
When necessary for the special holding of work, a power-operated mechanism can be provided with the machine for actuating chuck or special work-holding fixtures.

As with the Contin-U-Matic chucking model, the cycle is divided into two sectors. A loading sector covers the rapid return, high dwell and rapid advance of the toolheads, during which time the spindle is not revolving and the finished piece may be unloaded and the rough piece chucked. The machining sector occupies the greater part of the cycle, during which the work spindles revolve and the cutting operations are in process. The cycle time for various classes of work can be varied from 1 min. up to 15 min., as required, and rates of tool feed may be set within a considerable range and directly applicable to the job. Independent tooling on the six individual units which comprise the machine make it possible to vary the operation and even the nature of the work in process, running a variety of jobs at the same time, providing only that the common features of spindle speed and primary toolhead traverse are adaptable to all operations as a class.

In operation, the machine can be completely controlled from one position, while main-drive clutch levers are provided at three different points about the cycle.

Power requirements of the machine will range from 10 to 20 hp. and facilities are provided for motor drive with sprocket and chain connection to the main drive shaft. A constant-speed motor running at 122 r.p.m., with either a.c. or d.c. current, may be used. The approximate weight of the machine ready to operate is 22,500 lb.

Production-Type Hydraulic Feed Boring and Drilling Machine

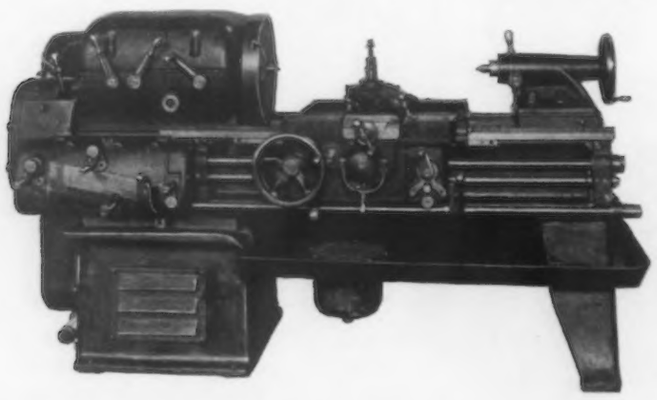


THREE different applications of its new No. 25 hydraulic feed boring and drilling machine will be exhibited by Baker Brothers, Inc., Toledo, Ohio. Features include direct gear motor drive for the spindles in the head, and the hydraulic Oilgear attachment for driving the feed mechanism. The machine is of sliding saddle type, the feed cylinder being cast integral with the saddle. The Oilgear pump is inside the frame of the machine and driven by a 1½-hp. motor, also located inside of the frame. The feed is engaged by pressure on a foot treadle at the front of the machine. The Oilgear feed has the characteristic rapid traverse, changing to proper cutting feed on entering the work at any predetermined point, and automatic quick return. The rate of feed for cutting is variable and may be changed or adjusted by a convenient lever. The points at which the rapid traverse changes to the cutting feed and at which the quick return starts are controlled by cams on the saddle.

The heads carrying the spindles are usually special, depending upon the work. The machine can be furnished as a single-spindle unit or with multiple spindles. It is said to be especially adapted for work in connection with an indexing table. In all multiple heads vertical adjustment is provided for each spindle to take care of the tool grinding and wear. All heads have hardened alloy steel gears mounted on ball-bearings with a sight feed oiler. Various heights or clearances between the spindle and base can be secured by means of spacer blocks.

14-In. Geared-Head Engine Lathe

A NEW model geared-head engine lathe for heavy-duty production work will be displayed by the Reed-Prentice Co., Worcester, Mass. Although rated as a 14-in. machine, the actual swing is 16½ in. over the bed and 10 in. over the compound rest. Sliding gears in the head give eight spindle speeds with only nine gears. The speeds range from 16 to 384 r.p.m., changes being accomplished by means of three levers at the front of the headstock. The quick-change bank has the unusual range of feeds from 0.0025 to 0.160 in. per revolution, and threads from 2 to 128. The driving motor is contained within the cabinet base and an adjustable idler is provided to secure proper belt tension. Two levers, one at the headstock and one at the apron, operate the friction start and stop. Feed changes, cross and longitudinal, are made by a single yoke-handled lever at the apron. The tailstock binder is of improved type.



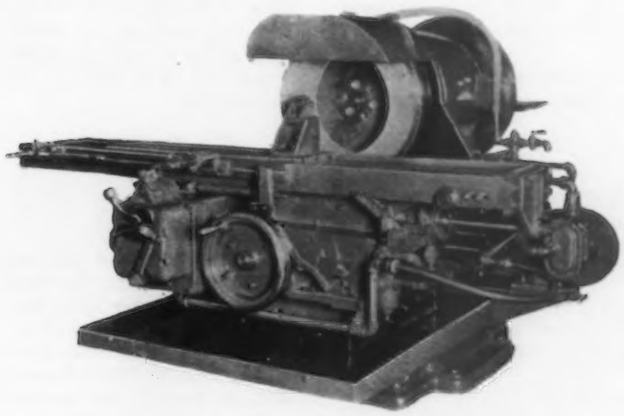
Production Drilling and Tapping Machine

LESS than the usual deflection caused by the thrust of driving high-speed twist drills to maximum efficiency is a feature stressed for No. 242 self-oiling all-geared drill and tapper built by the Barnes Drill Co., Rockford, Ill. This machine has a head which is unusually thick from front to rear, where it is flanged and securely bolted to the massive column.

Some of the distinctive features include seven Timken tapered roller bearings in the speed-change transmission; Fafnir radial ball bearings for the drive shaft and cross spindle; alloy steel heat-treated gears for quick change speeds; six splined spindles and six splined sliding gear shafts. The star wheel handle at the right of each spindle has a leverage ratio of 35 to 1. The steel sleeve has rack teeth, cut integral. The torque is taken by hardened rollers running free on the cross spindle. Spindle speeds up to 708 r.p.m. may be used. A multiple-disk clutch is used for driving, being controlled by a convenient lever on the left. For tapping, a reversing multiple-disk clutch and gears are added to the drive shaft. The table may have spacing blocks or a raising screw, as desired. The table is gibbed to the column ways and may be securely clamped in any position.

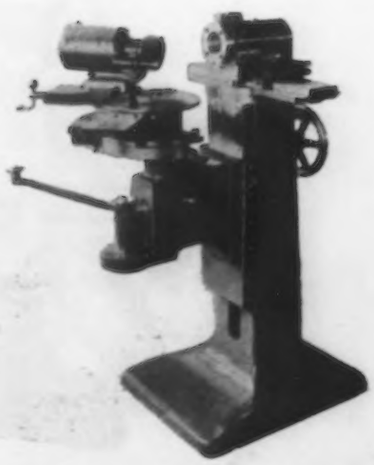
Hydraulically-Operated Face Grinding Table

A HYDRAULICALLY-OPERATED face grinding table which is fitted to its No. 8 machine, will be one of two new developments shown by the Badger Tool Co., Beloit, Wis. The table consists of two main castings, the compound slide fitted directly to the knee on the base casting and the reciprocating table top fitted to the top of the compound slide. A long brass cylinder with piston is fastened rigidly within the compound slide, the outer end of its rod being connected to a block attached to the rear end of the table top. The control box, with necessary valves, is mounted conveniently for the operator. Close to it is the automatic ratchet in-feed. The oil pump is driven by a separate motor, being mounted on a bracket at the rear. Pipe and flexible steel hose connect the pump, control box, cylinder and oil reservoirs, the latter within the machine base. The stroke may be set from 1 to 32 in.



The direction lever is connected directly to a hardened steel pawl. For automatic control the pawl comes in contact with the stop dogs locked on the side of the table top. Speed regulation may be adjusted instantly, even during grinding. There is no vertical adjustment to the face grinding table.

Face Mill Grinder Sharpens Face and Periphery at One Pass

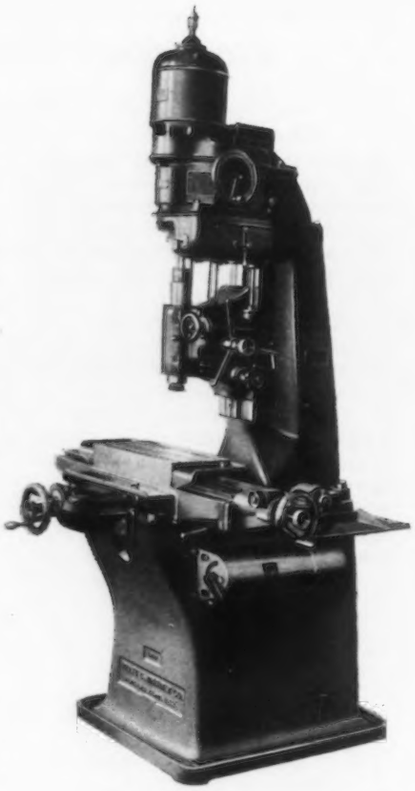


NEW equipment for sharpening face milling cutters will be featured by the Oliver Instrument Co., Adrian, Mich. The machine grinds the face and periphery of the cutting blade at one pass of the wheel and forms a circular corner which joins the two, so that the entire cutting edge is smooth and continuous. This machine is adapted for grinding other types of milling cutters and form tools, and for other grinding operations requiring a radial motion of the grinding wheel or a combination of straight and radial grinding. The extent of the arc ground is governed by the position of two cam plates beneath the motor slide. With the plates furnished, the capacity is for arcs having included angles from 60 to 120 deg. Special plates permit grinding of arcs with included angles of 180 deg. Among the features of design is the spindle, which has the standard spindle nose adopted by the milling machine manufacturers. The bearing has transverse and longitudinal adjustment for cutters up to 18 in. in diameter and 6 in. thick.

New Jig Borer for Small Work

INCLUDED in the comprehensive exhibit of the Pratt & Whitney Co., Hartford, will be a new jig borer, designed particularly for small work. This machine, designated as the No. 1, is similar to the company's larger jig borer, the No. 2, previously announced.

The machine is equipped with a four-speed motor and a set of back gears, which give eight spindle speeds up to 1800 r.p.m. The wide speed range, together with the reversible power feed, is stressed as adapting the machine for drilling or boring in any material. Heavy spindle quill construction, narrow head guides and simple speed and feed controls are also features. As in the No. 2 machine, the new jig borer uses screws for table movement but does not depend on them for measurements. The position of the table, and the work, is controlled entirely by end measures, inside micrometers and built-in indicator dials. These instruments are designed to keep a positive check on the position of the table before, during and after boring. This method of measuring is pointed out as being fundamentally correct as it is entirely independent of wear in the machine. Complete tool equipment, including a rotary indexing table, is available.



Tool Room Lathe and Drill and Tapping Heads

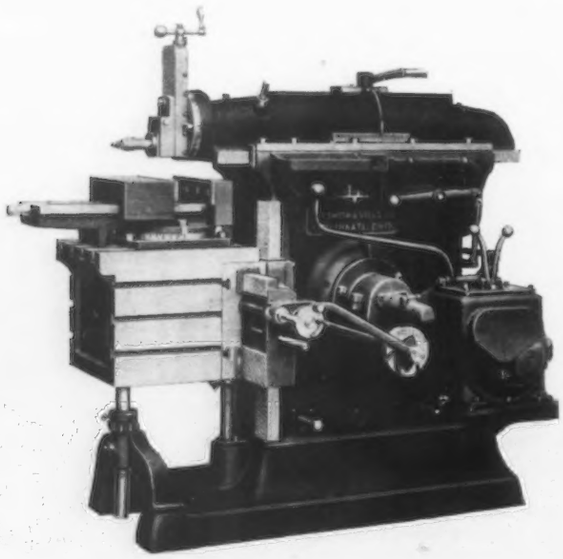
AN all-geared universal tool room lathe with motor drive, together with unit-type drill heads and tapping heads will be shown by the Bradford Machine Tool Co., Cincinnati. The lathe features a universal relieving arrangement, coarse screw-cutting device, taper-turning device, draw-in collet arrangement, quick change feeding and threading, and a special oil pump and pan. About two-thirds of the entire power transmission is contained in the front speed box leg.

The unit-type drill head is self-contained, with the motor and feed mechanism built into the one unit. Rapid approach to the work and rapid return are features. The cycle of operations is imparted to the spindle by a positive feed cam driven by clutch from the spindle. This makes one complete revolution or cycle each time the starting lever is depressed. Spindle speeds can be varied between 75 and 2000 r.p.m.

The tapping mechanism is built into the head, making a complete unit. A positive-rise cam imparts the desired lead to the spindle to correspond to the tap lead. The return of the spindle is controlled by the cam, making the entire operation along a predetermined cycle. From 8 to 32 threads per inch may be obtained.

Improves Back-Geared Crank Shaper

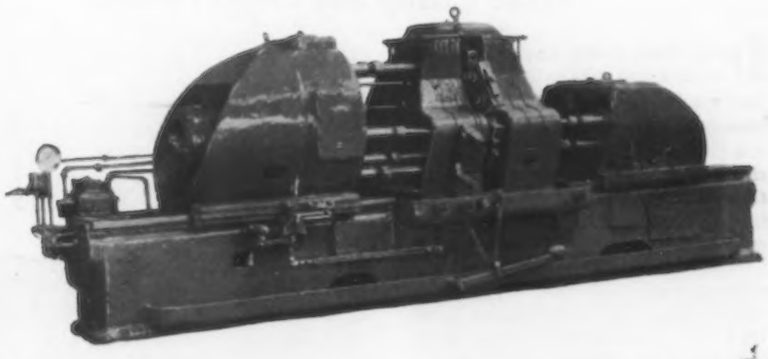
A TWENTY-FIVE-INCH heavy-duty back-geared crank shaper incorporating a number of improvements will be shown by the Smith & Mills Co., Cincinnati. These machines are built in 16-, 20 and 25-in. sizes. The 25-in. unit will be arranged for 7½-hp. motor drive operated by start-and-stop push button control. All gears in the speed box and inside of column, except the main gear, are of the cluster type, and are of alloy steel, heat-treated and hardened, with the teeth rounded by machine to facilitate meshing. All sliding gears are broached and slide on multiple splined shafts of high-carbon steel. The shafts in the speed box are mounted on Timken tapered roller bearings. Internal ratchet feed is provided with a drop forged pawl and trip. The solid feed rod has a graduated feed disk showing number of notches in variations of 1 to 15. A single-screw, parallel-jaw vise is furnished, with graduated swivel base.



The drive is transmitted through twin-disk clutch acting upon a six-splined shaft. The clutch and self-acting brake are controlled by a single ball lever. Eight cutting speeds are provided to the ram through the speed box and back-geared drive. A one-shot lubricator, operated by foot, supplies fresh oil to all main bearings and ramways, as well as to other parts of the machine.

Production Boring Machine with Hydraulic Feed

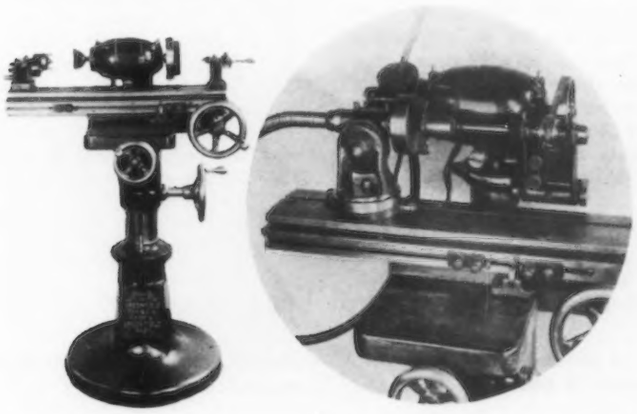
HIGH productive capacity is claimed for the heavy-duty multiple spindle production boring machine of the duplex type, to be exhibited by the W. F. & John Barnes Co., Rockford, Ill. The machine illustrated is of horizontal type, and the work for which it was designed includes simultaneous drilling, boring, hollow milling, box milling, line reaming and chamfering and facing. The left-hand shaft contains ten spindles, and the right-hand head, four spindles. These spindles are mounted in tapered roller bearings and are driven by hardened steel gears. Lubrication is by the splash system. Because of the large area over which the spindles in the left-hand head are distributed, the cascade oiling system is also employed. The spindles have nose adjustment to provide for accurate tool setting and to compensate for the grinding of tools. The spindle drive is



by individual motors mounted at the rear of each head. Feed of the boring heads is by means of an Oilgear full automatic pump. The cycle of operations of this particular machine is rapid traverse forward, automatic shift to slow speed for drilling, boring and hollow milling, automatic trip to slower speed for facing; then automatic quick return. A wide variety of rates of feed may be obtained. The one-cylinder Oilgear cylinder, which drives both heads simultaneously, is inclosed in the bed. A six-station trunnion fixture provides for loading two castings in each station, the operator loading and unloading at one station while all other five stations are operative. Two pieces are completed at each cycle.

Universal Tool and Cutter Grinder Has Flexible-Shaft Driven Attachments

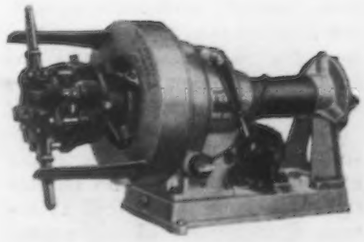
SINGLE motor drive, with the motor mounted integral with the wheel head, is the outstanding feature of a new No. 3 universal cutter and tool grinder which will be shown for the first time by the Greenfield Tap & Die Corporation, Greenfield, Mass. Compactness and freedom from vibration are general features stressed. A ½-hp. 3600-r.p.m. motor for 60-cycle, 220 volts, alternating current is used.



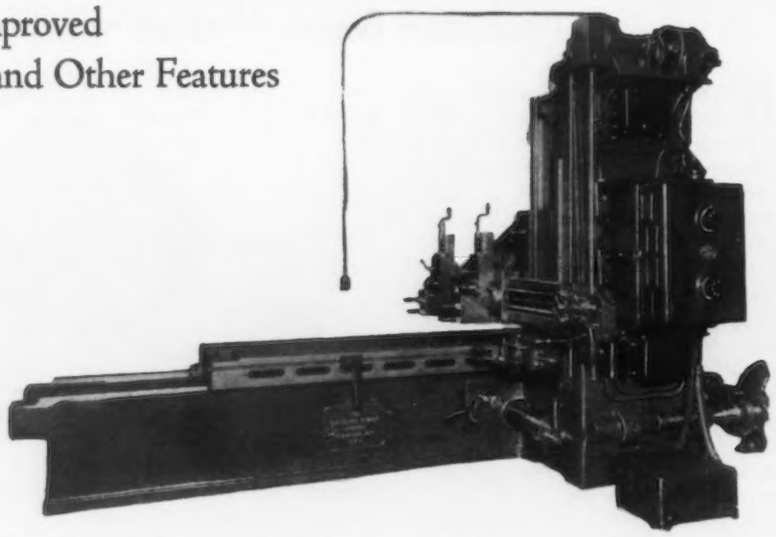
In this machine the drive to the headstock for the plain grinding attachment and to the chuck for internal work is through a flexible shaft and small worm gear box, which reduces the speed of the chuck and headstock to 480 r.p.m. The flexible shaft housing can be affixed quickly to the motor housing. The internal grinding attachment, of improved design, is driven by belt from the motor head, the speed of the internal spindle being approximately 13,000 r.p.m. The use of the flexible shaft drive eliminates the necessity of a second motor on the headstock, and provides, it is claimed, a more compact design.

Portable Pipe Threading Machine

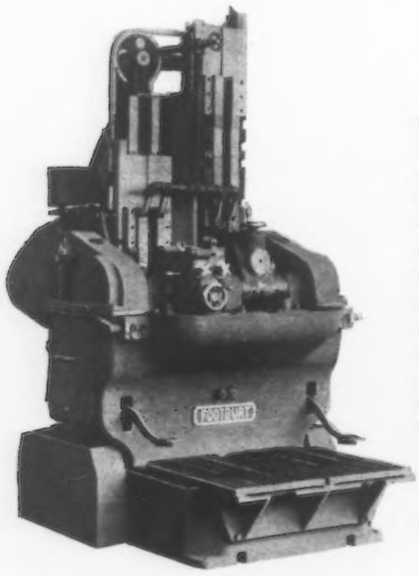
PORTABLE pipe threading equipment designated as the No. 414 Power Boy will be one of the machines featured by the Oster Mfg. Co., Cleveland. This unit accommodates pipe from ¼ to 4 in. in diameter and will drive geared die stocks up to 12-in. capacity through an auxiliary drive shaft. The drive is by means of a ½-hp. variable-speed motor which takes current from a light socket. A gear shift lever is used to obtain fast and low speed changes, the variable-speed motor also taking care of speeds required for various sizes of pipe. Light weight is a feature, an aluminum alloy being used extensively in the machine. The unit is 47 in. long, 20 in. wide and 24¾ in. high and may be mounted on a bench.



Open Side Planer with Improved Head Clamp and Other Features



DIAL feed, power rapid traverse, automatic trip to the rail raising mechanism, forced feed lubrication to the vees, and improved head clamp are among the features which will be stressed by the Cleveland Planer Co., Cleveland, in its demonstration of the open side planer here illustrated. The improved head clamp locks the slide rigidly without change of slide adjustment. The power rapid traverse is designed so that it is impossible to engage feeds and the power rapid traverse at the same time. Simplicity of the dial feed is also a feature. The number of parts is small and there is no idle running mechanism. It is stated that this feature has not increased the length of the rail on the operator's side of the planer, and therefore has not changed the central control position. The solid top bed with full depth sides, column base integral with the bed up to the table level, and the planing of the bottom of the bed, have been retained in the late models of these machines.



Flat Surfaces Finished by Broaching

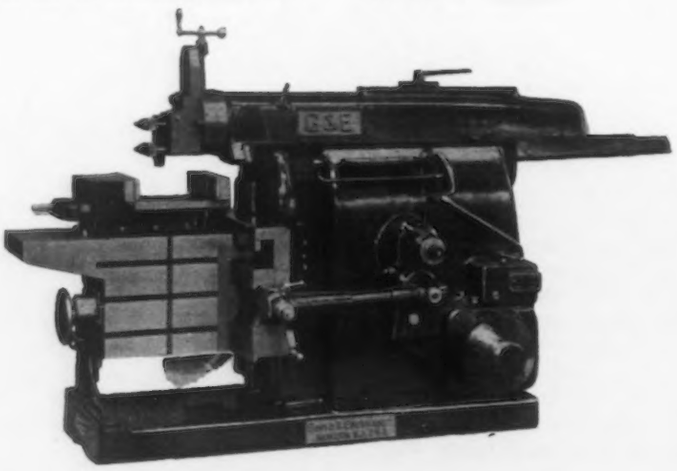
THE finishing of flat or irregular surfaces by broaching will be demonstrated by the Foote-Burt Co., Cleveland, on the new machine illustrated. With this machine one or more surfaces are roughed and finished in one operation. Excellent finish and close accuracy are claimed and in the broaching of both sides of the two bosses, four surfaces in all, on an automobile front steering spindle connecting rod yoke, the production from one operator and one machine is said to be at the rate of 600 per hr.

In this design, slides to which cases holding the broaches are bolted operate alternately up and down on the ways of the uprights of the machine. The drive is by a 17-hp. elevator-type reversing motor, through spur and bevel gears to the driving pinion. This pinion is located between the two slides and meshes with hardened steel racks on the slides. The slides counterbalance each other and as one moves up the other moves down. They operate continually at a predetermined speed. A tip-up fixture is employed for holding the work to be broached. Broaches and fixtures used on the machine vary according to the nature of the work.

New Shaper of Manufacturing Type

A NEW shaper of the manufacturing type, designed to combine unusual strength and rigidity with speed and power, will be in operation in the space of Gould & Eberhardt, Newark, N. J. Features include: Single-cam power feed; dual control for table hand feed; power rapid traverse to the table; double crank gear; all gears heat treated; anti-friction bearings; chilled ram guideways; metal to metal clamp between rail and frame; circulatory pressure oiling and a direct-coupled motor.

The power rapid traverse, controlled by a single lever, operates at 100 in. per min. The dual control provides a hand feed at the table front in addition to the usual control at the end of the cross rail. The frame is unusually wide and deep to provide rigid cutting stress resistance.



Automatic Screw Threading Machine Produces 3600 an Hour

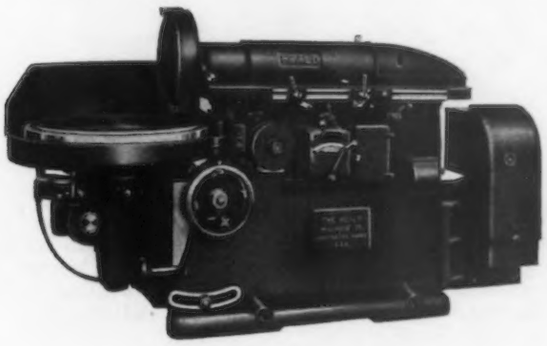
AMONG the several machines to be demonstrated by the Brown & Sharpe Mfg. Co., Providence, will be the 00G motor-driven high-speed automatic screw threading machine illustrated. It will be in operation on a brass screw job, the production being at the rate of 3600 per hour. These machines have a horizontal spindle carrying a die which is mounted in line with, and opposed to, the work spindle. Both spindles run in the same direction, the difference in speeds permitting the die to run on after it has been fed to position by the cam. An important feature is the accurate and positive control for stopping the die spindle, which insures uniformity for the threaded length. Front and rear cross slides do forming and similar operations, and an arm is provided to take the piece after it is cut off and swing it into position for slotting.

One of the company's No. 2 high-speed automatic screw machines, for motor drive only, will be equipped with a new vertical slide, the arrangement of which may be noted from the illustration above. This attachment is said to increase production because it eliminates a swing tool and permits faster feeds. It also reduces the revolutions required for tool clearances.

New Large Capacity Surface Grinder

DIESEL engine rings, saws, and dies are given as typical parts that may be ground accurately and with excellent finish on the rotary surface grinder illustrated, which will be one of the machines demonstrated by the Heald Machine Co., Worcester, Mass. This machine, which is designated as the No. 25A and is intended for large work, can be equipped with magnetic chucks ranging from 16 to 30 in. in diameter.

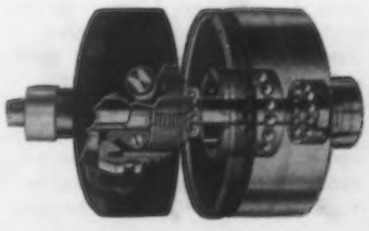
Full motor drive, including a variable-speed motor for driving the chuck which is started and stopped by push-button control with dynamic brake, is provided. The wheel slide is reciprocated hydraulically, giving unlimited variations of speed between maximum and minimum. Chucks up to and including the 24-in. size can be equipped with a micrometer diamond, which permits duplicating the thickness of the work conveniently and accurately. The chuck bracket has dovetail ways that slide on an intermediate swiveling member, which is said to minimize overhang and permit rigid clamping of the swiveling member to the base. When desired the chuck can be tilted by handwheel to allow for concave and convex grinding. Feed to the chuck is by handwheel and vertical screw through a nut. Graduations on the handwheel indicate 0.0005-in. movement of the chuck. Automatic vertical feed is available as an extra. The main drive shaft at the rear of the machine is mounted on ball bearings. Oiling bearings is from a central oil system. A 15-hp. 850-r.p.m. motor is used for the main drive and a 2-hp. variable speed motor for the chuck.



Lathes with Leak-Proof Multiple Disk Clutch Unit

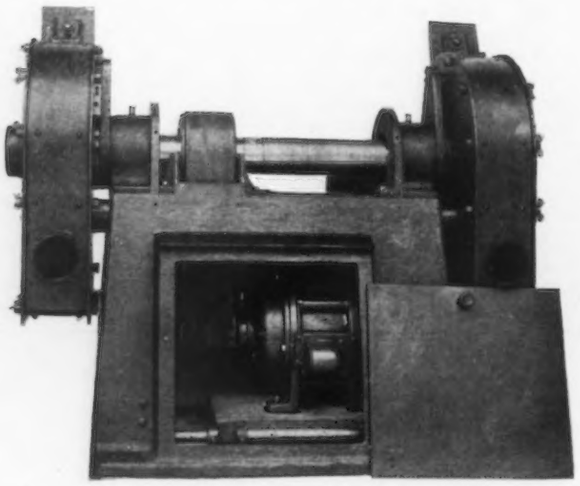
UNUSUAL pulling power and sensitiveness of control are claimed for a new ball bearing multiple disk clutch unit which will be displayed in connection with geared-head lathes of the American Tool Works, Cincinnati. Ease of adjustment is also a feature, this adjustment being made through a threaded collar on the outside of the clutch where it is always accessible. The clutch unit is oil-tight.

This entire clutch unit is mounted on ball bearings and the thrust of the multiple driving disks is taken on a ball thrust bearing. The driving disks are continuously flooded by oil under pressure. When a geared motor drive is used on the latter the pulley is replaced by a heat treated alloy steel herringbone gear. This driving unit may be arranged to drive in both the forward and reverse directions, without reversing the direction of the pulley or the herringbone gear. When the reversing mechanism is incorporated, a brake is provided. The clutch unit is operated by a drop lever located on the lathe head, and also by a mechanical control lever at the right hand side of the apron.



Progressive Transfer of Grinding Wheels Maintains High Production

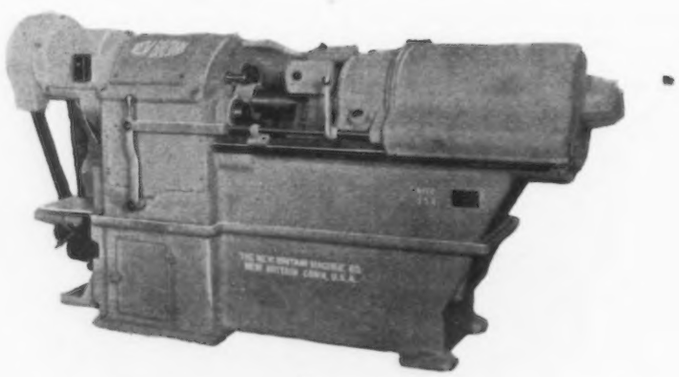
A LINE of grinding machines upon which transfers of wheels are made from one machine to another in order to save in abrasive costs and keep the wheels at high peripheral speed at all stages, will be featured by the Ransom Mfg. Co., Oshkosh, Wis. The wheels are transferred every 3 in. of wear, from the 30-in. diameter down to a stub of 7 or 8 in. The guards limit the size of wheel used on individual machines, so that the correct wheel will be placed on any given spindle and will be given the proper speed. Large flanges on each machine will automatically stop the use of any wheel when it has worn off enough for the purpose of that machine. It then will fit the next machine. This idea is carried through the entire group.



Large guards with hinged doors facilitate quick transfer of wheels. Adjustable and removable brackets with a removable front section to the guard make it possible to perform knee grinding at any time. It is claimed that the progressive changing of wheels, by keeping the average surface or working speed of the wheels at the maximum, will insure high efficiency of production.

Automatic Chucking Machine for Small Castings or Forgings

AN automatic chucking machine for small brass, iron or steel castings or forgings for turning, boring, facing, threading and similar operations will be demonstrated by the New Britain Machine Co., New Britain, Conn. This machine, designated as the No. 23A, is of the tool-rotating type and has four spindles.



Features include air-operated chucks; independent spindle feeds up to 1200 r.p.m.; independent spindle feeds; rapid index, less than 1½ sec. total time for spindle drawback jump and turret index; and piloted turret support, chucking and work supported between two bearings. Also automatic turret clamp; centralized control for operating air valves and starting and stopping the machine; single casting bed with integral and closed headstock and automatic force feed lubrication for oiling 56 holes. Hydraulic operation of the chucks, instead of pneumatic, may be arranged if desired. A very high rate of production is claimed. The machine will be in operation on globe valve bonnets, the operation being drilling, boring, facing, tapping and threading.

Automatic Double-Carriage Manufacturing Lathe

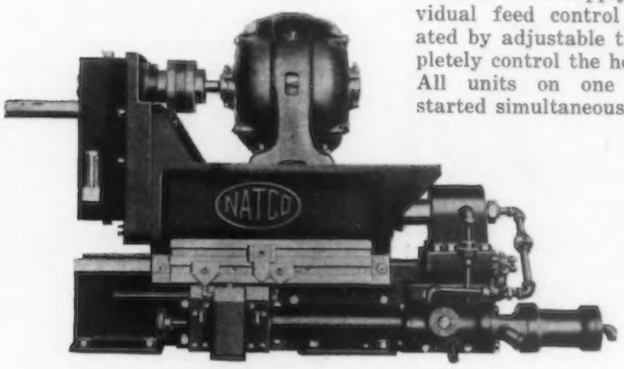
A NEW full automatic double carriage manufacturing lathe will be one of the features of the exhibit of the Monarch Machine Tool Co., Sidney, Ohio. Spindle and all shafts are mounted in Timken roller bearings. A worm drive is provided to the main spindle and convenient pick-off gears are provided to change spindle speeds. Pick-off gears also provide for feed changes. The tailstock is of a new design, one lever operating the spindle and locking the tailstock spindle when properly engaged. Four standard cams provide both longitudinal and cross feeds to the tool slides on both carriages. Tools are under power rapid traverse except when actually removing metal.

The principal specifications are as follows: Range of spindle speeds, 16 to 450 r.p.m.; range of feeds, 0.005 to 0.065 in.; diameter of work which can be machined, 15 in.; distance between centers, 22 in.; height of center from floor, 36 in.; weight of lathe complete, 7200 lb.; power required, 7½ to 10 hp.

The Monarch company will also exhibit a new 20-in. manufacturing type lathe with the spindle mounted in Timken tapered roller bearings of the precision type, and a 16 in. x 6 ft. helical geared head, ball-bearing motor-driven tool room lathe complete with all equipment.

High-Speed Sliding-Head Hydraulic Drilling Unit

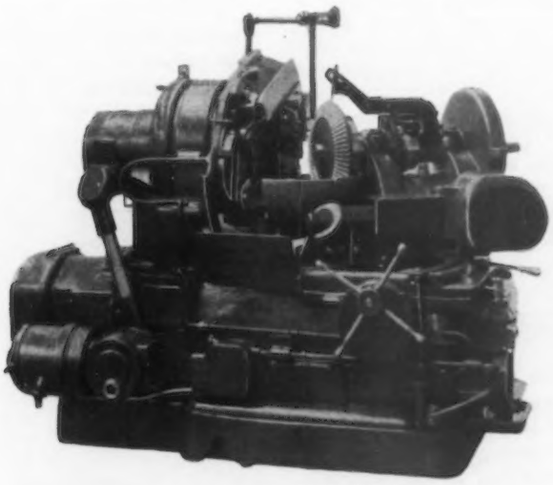
THE National Automatic Tool Co., Richmond, Ind., will exhibit a complete machine built up of its latest hydraulic unit drilling equipment. This new high-speed driller, designated as the 4-in. sliding-head type, is offered as incorporating several unusual features. Each unit, with motor and spindle box, is a complete drilling machine when attached to a supply pump. Individual feed control valves, operated by adjustable trip dogs, completely control the head movement. All units on one machine are started simultaneously from a single valve at the operator's position, after which they go through the cycle of rapid forward, slow feed, rapid return and stop, automatically. This starting valve also serves as an emergency reverse.



To conserve space and piping, some radical changes have been made in the general design. The hydraulic cylinder is cast in the head slide and the feeding pressure, for both forward and reverse, enters through the center of the piston shaft. This reduces the over-all dimensions of the device. Each unit will drive two 1-in. drills at 0.010 in. feed in cast iron, and the feeding rate can be set from zero to the rapid traverse rate of 75 in. per min. A 3-hp. is used for capacity drilling.

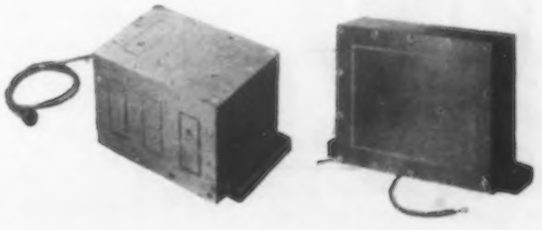
Automatic Straight Bevel Gear Generator Using Two Tools

QUICK set-up, rapid production and high quality of finished work are claimed for the gear generator here shown, which will be one of the machines exhibited by the Gleason Works, Rochester, N. Y. The machine is a complete unit for rough and finish cutting of large or small quantities of straight bevel gears. The capacity is for gears not exceeding 3 diametral pitch, 10 to 1 ratio, and a cone distance of 8½ in. The largest miter gear is 12 in. in diameter and the largest flat gear is 17 in. in diameter. Two tools do the cutting, one on each side of the tooth, and it is claimed that high tool speed can be maintained practically without vibration or noise. The drive for the tools is arranged to give the effect of a draw cut and on the return stroke each tool is mechanically relieved a small amount from the cutting surfaces. The correct ratio of generating roll of tools and work is obtained by means of change gears and indexing is accomplished with a mechanism of the stop-wheel type. A range of tooth numbers from 8 to 100 and most of the numbers up to 200 may be cut with the regular equipment. The machine is fully automatic and will stop when the last tooth is cut. Attention has been given to rigidity of construction and ample adjustment for wear is provided. Lubrication is for the most part automatic.

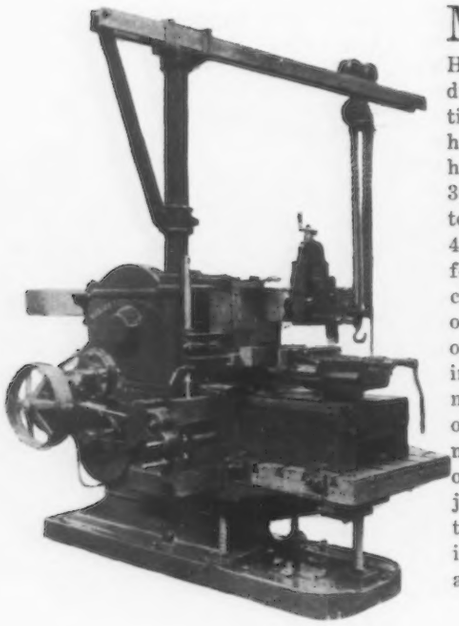


Magnetic Chucks of New Design

MAGNETIC chucks to be shown by the O. S. Walker Co., Worcester, Mass., will include a unit designed so that one coil, when energized, develops magnetism in both vertical and horizontal faces of the chuck at the same time. The chuck of this type illustrated is 9½ in. high and 9½ in. wide. It can be made in any length, and is adapted for the grinding of knife bars and similar pieces where it is desirable to grind both sides and edges without disturbing the setting of the chuck. It is adapted for holding heavy shear blades. Another development, also shown above, is a chuck both front and back faces of which become magnetically active when the coil is energized. These chucks, developed for a special job, are 11 in. high and 14 in. long and are used in a vertical position, several chucks being placed in line on a table for holding channels on automatic drilling machines.



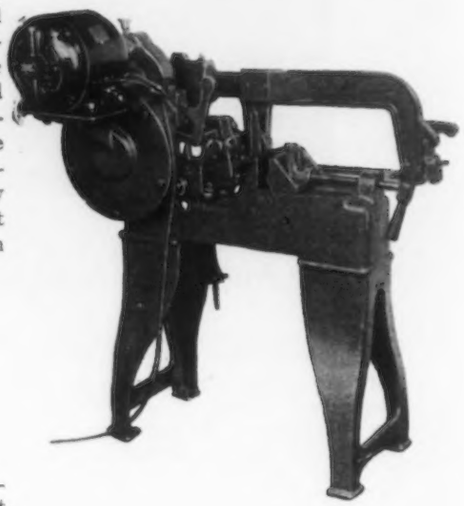
38-In. Heavy-Duty Draw-Cut Planer



MACHINES to be shown by the Morton Mfg. Co., Muskegon Heights, Mich., include a heavy-duty draw-cut planer with a cutting stroke of 38 in. This machine has a vertical feed of 21 in. and a horizontal feed on the crossrail of 36 in. The crossrail can be extended to provide horizontal feeds 48 in. or 60 in., if desired. All feeds are automatic and can be changed while the machine is in operation. Cutting is performed on the draw stroke, thereby drawing the cutting strains against the machine column. The clutches and other important parts are automatically oiled and all bearings are of bronze. The machine has adjustable back bearing, auxiliary table, large T-slotted table, etc. It is equipped with a jib crane with a hoist of two speeds.

4½ In. Dry-Cut Metal Saw

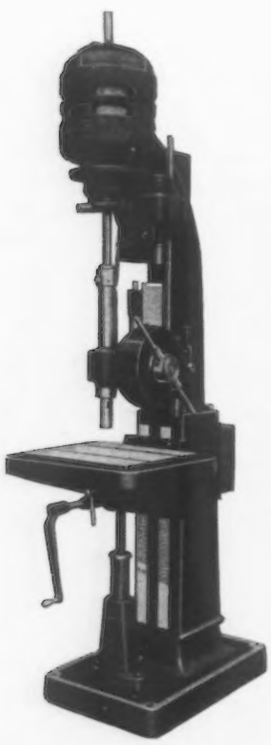
HIGH-SPEED sawing machines arranged for individual motor drive will be displayed by the Peerless Machine Co., Racine, Wis. Features of the dry cut unit illustrated include high speed cutting, 75 to 100 strokes a minute; uniform lift on the non-cutting stroke and the fact that the saw frame will



remain in any position to which it is raised from the work. The feeding mechanism is operated by a cam and spring. The capacity of the machine is for 4½-in. stock, the stroke being 4½ in., with a saw blade length of 10 in.

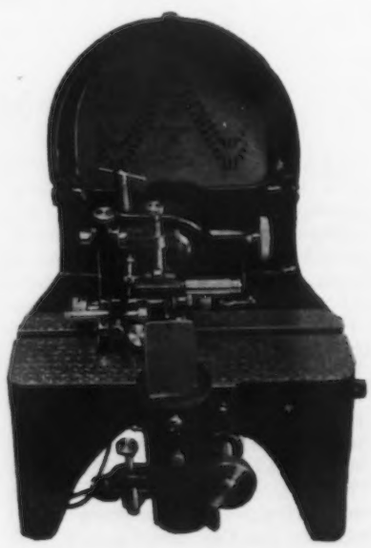
Motor-Spindle Drilling Machines

MOTOR spindle machines, designated as the Motor-Avey, arranged as shown in the cut below, as well as several sizes of the belted Motor-Avey type machines, will be demonstrated by the Avey Drilling Machine Co., Cincinnati. Simplicity and facilities which permit of high production are general features claimed for these machines. Low voltage and time limit overload protection, thermal relays and push-button control for each spindle on multiple spindle machines are provided on all direct and semi-direct motor driven machines of 1-hp. or over. The control buttons are usually put under the front of the table.

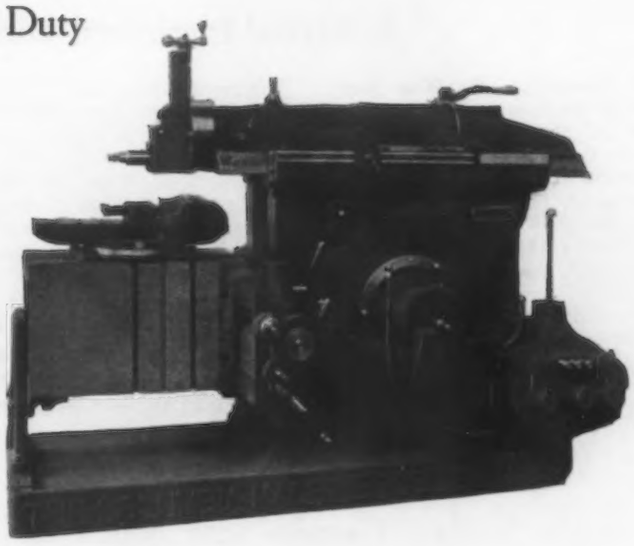


Staging Attachment for Hartness Comparator

IN addition to two Fay automatic lathes and two J. & L. flat turret lathes in actual operation on production work, the Jones & Lamson Machine Co., Springfield, Vt., will exhibit a bench type Hartness screw thread comparator equipped with a new type of mounting fixture. The device has been developed to accommodate a wide range of diameters and pitches of screws and taps. The stage is made up of a frame carrying rolls on which the threads are supported at the pitch line, an adjustable back stop for positioning the screw on the top, and a spring plunger which holds the screw down to the roll and back against the stop. With the adjustments provided the pitch diameter, lead and form of screws from 1¼ to 1⅜ in. in diameter and any pitch from 6 to 28 in. the diameter range can be tested. It is pointed out that being universal, the fixture does away with a large number of snap, ring and lead gages previously required to test a variety of sizes.



Crank Shapers for Heavy Duty

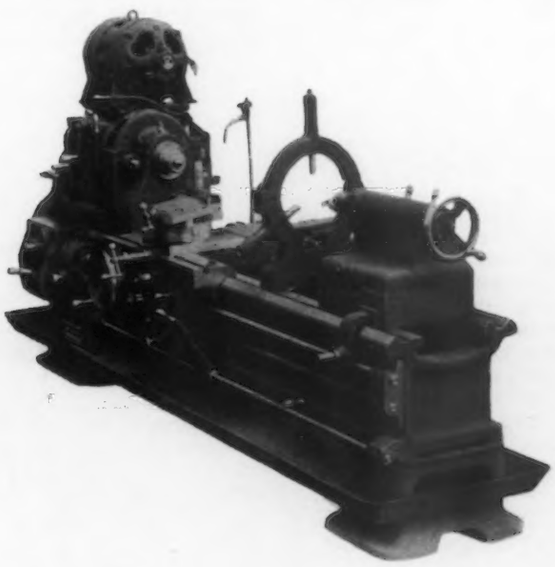


IMPROVED heavy-duty crank shapers, features of which include V-ways to ram, helical bull gear and pinion, hardened alloy steel gears throughout, except the bull gear; flood lubrication, and a selective type speed box with single lever control and interlocking device, will be displayed by the Columbia Machine Tool Co., Hamilton, Ohio. The machine is made in 16, 20, 24, 28, 32 and 36-in. sizes.

The illustration shows the 32-in. model back-geared shaper, which has as extra equipment a power down feed to the head. All models are designed with constant-speed motor drive, the connection being made by means of a rawhide pinion and spur gear, which transmits the full power of the motor without slippage. The quick-change feed is fully automatic and is graduated to show the amount of feed; it is equipped with bevel gear reverse which insures the feed taking place on the return stroke. Two levers control all feed changes, one for the amount of feed and the other for direction. Changes can be made instantly while the machine is running. The machines are designed for all classes of shaper work. Special attachments for railroad work include a locomotive shoe and wedge chuck and a driving-rod brass attachment, knee type table with removable top and extended head with automatic circular feed.

Offers Improved Geared-Head Lathe

A LATE model geared-head lathe provided with 16 spindle feeds, obtained simply by shifting a lever, will be in operation in the space of the Cincinnati Lathe & Tool Co., Cincinnati. The gears are of manganese-chrome steel forgings, heat treated and ground and are contained in the lower half of the housing which is of oil-tight box construction. At the bottom of the housing is a sediment basin through the lowest point of which the oil may be entirely drained and new oil supplied for the head stock. A sight-feed oil gage located at the rear shows the level at which the oil is to be maintained. The gears run in a bath of oil and all bearings except the main spindle bearings are lubricated by the splash system, even when operating at the slowest speeds. The main spindle bearings are lubricated by sight-feed oilers.



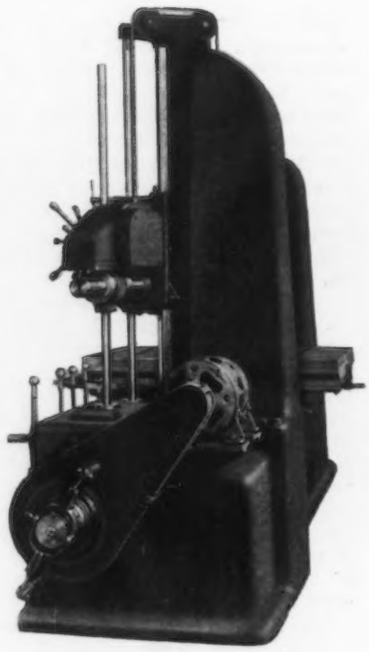
The clutch or driving mechanism is made an integral part of the housing to reduce overhang and relieve the drive shaft from bending strains. Adjustment for wear may be made conveniently. The clutch is of the compression disk type and is arranged for operation from the apron lever or from a lever on top of the headstock. The same lever is also used when moving the gears slightly when changing spindle speeds, thus avoiding gear clash. These machines are available in swings from 15½ to 32 in.

To Exhibit New Automatic Forming and Threading Machine

A NEW machine designed for pointing and threading bolts, cap screws, etc., automatically, will be one of the machines at the booth of the Landis Machine Co., Waynesboro, Pa. It is employed not only for pointing bolts, but also for forming the ends of parts to be threaded, when they are within the range of the machine. The machine is of the semi-vertical type and has not been exhibited before. The company will also show its older models of forming, threading and cutting off machines.

Universal Horizontal Boring Machine

THE heavy-duty Tri-Way horizontal boring machine to be shown by the Universal Boring Machine Co., Hudson, Mass., is of new design and is intended to meet the demand for greater vertical range and to provide maximum boring and milling capacity when operated at the limit of travel. To provide this increased capacity, a heavy-duty head and rear posts of sufficient size and strength to resist the strains set up by boring and milling operations have been developed. The main driving clutch and the clutch for reversing the spindle have been increased in capacity to provide greater power. This new model is available in a variety of combinations of sizes of bed, vertical travel of head and size of table to meet special requirements. The machines vary in weight, according to dimensions, from 14,500 to 17,400 lb. The maximum size will take 8 ft. between the faceplate and the rear bearing. The distance from top of table to center of boring bar is 40 in., while the table measures 32 x 52 in.

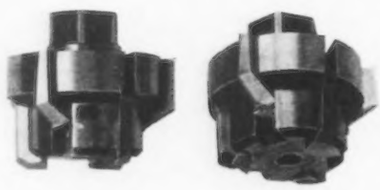


Automatic Surface Grinder with Motor Spindle

AN automatic surface grinder with direct motor spindle, provided with ball or roller bearings as the buyer desires, will feature the contribution to the show by the La Salle Tool Co., Ottawa, Ill. Driving gears are in one housing and together with reverse mechanism run in oil. There is one switchboard and unit control. The machine is known as the No. 2 La Salle.

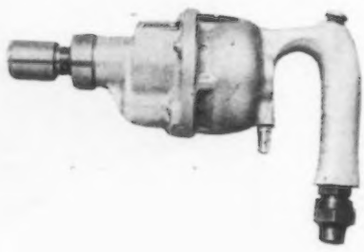
Inserted-Blade Multiple Boring Tool

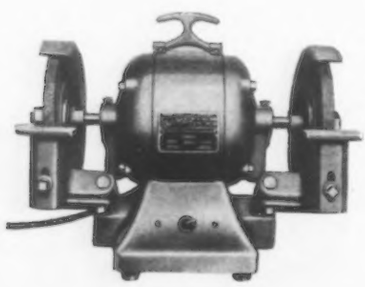
NEW inserted-blade tools to be shown by the Gairing Tool Co., Detroit, include the multiple boring tool illustrated, which can be adapted to the Gairing standard drive shank. The blades of these tools are held in the body by friction, a double angle causing the blade to tighten itself in place and have a bearing on all sides, making, it is stated, a rigid and practically a solid tool. Wide range of adjustment is possible by placing shims in the slot at the bottom of the blade. The bodies are of vanadium steel. A feature is that the blades have a bearing on the bottom on both sides of the dovetail slots. The tools can be made from 1¼ in. to any size desired.



Air-Operated Screw Driver

AN air-operated tool, intended primarily for driving screws, but which may be used also for setting nuts, cap and set-screws, etc., will be among the machines shown by the Buckeye Portable Tool Co., Dayton, Ohio. The tool is compact and of light weight. It is ball bearing throughout and has button throttle control. It is stated that the machine is capable of driving a No. 15 screw, 3½ in. long into yellow pine filled with pitch, without previous tap hole drilling. Rotary construction is stressed as eliminating vibration, and the four blades of the rotor being the only wearing parts, maintenance is said to be minimized. Gears are of heat-treated chrome nickel steel, and the jaw clutch drives directly from the spindle. The length of the tool overall is 10 in., the length of the main body 6 in., and the largest diameter is 3⅝ in. The weight is 5⅜ lb.



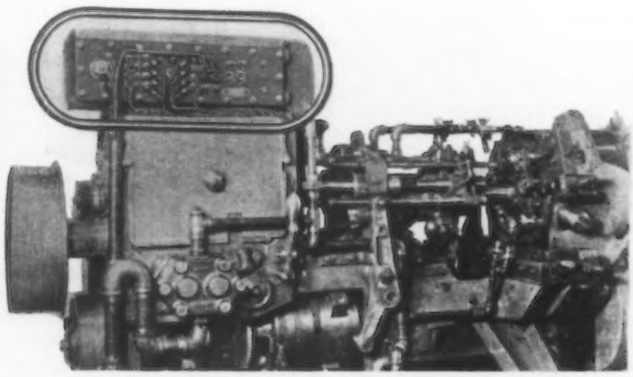


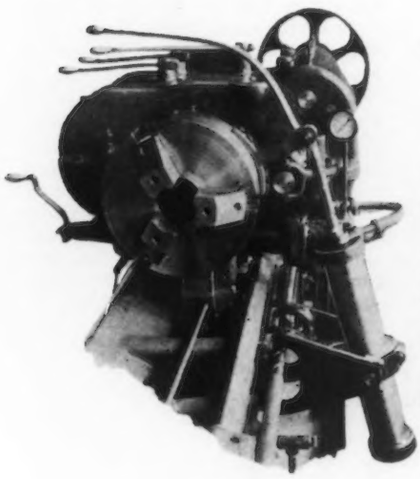
Ball-Bearing Bench-Type Grinder

A 6-INCH bench grinder equipped with two grinding wheels, adjustable tool rests, wheel guards, switch and cable, will be among several electrical tools exhibited by the Van Dorn Electric Tool Co., Cleveland. This machine is provided with a handle for convenience in carrying the tool about the shop, and a safety feature is the adjustable wheel guards, which may be so arranged that the front end of the guard is always close to the grinding wheel. The wheel is 6 in. in diameter, ½-in. face and ½-in. hole. The speed is 3600 r.p.m.

Automatic Lubricators Applied to Machine Tools

RECENT developments in lubricating practice will be shown by the Madison-Kipp Corporation, Madison, Wis. The one illustrated is on a model C machine of the National Acme Co., which has a special lubricator installation. The lubricator has been made as an integral part of the motor base in place of the separate tank usually furnished. The reservoir is a part of the machine casting, while the lubricator mechanism is submerged in it. In this particular case the mechanism is placed on the side. It is driven from a rotating spindle on the machine so that it operates automatically with the machine and every important bearing is reached. Other applications include a wood-working saw in which the ways and the chains which feed the work are lubricated.





Universal Turret Lathe with Hydraulically-Operated Chuck

IN addition to a No. 5 universal turret lathe, the Foster Machine Co., Elkhart, Ind., will demonstrate its No. 3-B universal turret lathe equipped with a hydraulically-operated Foster-Barker chuck. Features of these machines include multiple-disk clutches in the head, which make it possible to change spindle speeds without stopping the machine, and V-type ways. The bar capacity of the No. 5 lathe is 1 13/16 in. and the swing over the bed is 17½ in. The turning movement is 11 in. The hydraulically-operated chuck operates from the lubricant pump regularly furnished for pumping coolant to the tools. This supplies cutting lubricant under pressure to the operating cylinder of the chuck. The control valve is operated by a hand crank at the front of the machine.

Automatic Idler Applied to Machine Tools

AN automatic idler applied to machine tools will be one of the exhibits of the Link Belt Co., Indianapolis. The device may be used with either plain or back-type chain. It is claimed that mutually reversed rotation can be secured as with gears, but without backlash or noise. Speed ratios may be altered without special parts, while the device provides continuous automatic adjustment through the use of a coil spring, as shown in the illustration, representing drive from a motor below to two spindles above. Unusually smooth operation, long life and diminished upkeep costs are general claims.

Drop-Forged Alloy-Steel Wrenches

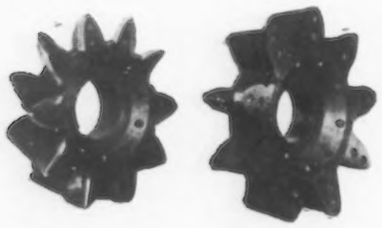
DROP-FORGED wrenches of its Superrench line will be displayed by J. H. Williams & Co., Buffalo. Strength and toughness as well as refinement in design and decrease in weight, are features emphasized for these wrenches which are of chrome-molybdenum steel. The tools are of thin section and have pointed jaws, which adapts them for use in tight places.

New Foot Control Air-Operating Valves

TWO models of a new type of foot control air-operating valve, designed for rapid and sensitive operation will be on view at the booth of the Logansport Machine Co., Logansport, Ind. One valve, designated as the model G, is of single pedal type for operating devices where the air is required on one side of the cylinder pistons for a short duration of time only. The other valve, known as the model H, is of double pedal type and is for operating cylinders which require air on both sides of the piston for a longer time than it would be practical for the operator to retain pressure on the pedal. Both models, which are available in four sizes, from ¼ to 1-in., are of poppet type arranged for direct piping to the cylinder. The number of working parts have been reduced to a minimum and all parts are accessible. The air ports for intake and exhaust are of full rated capacity to assure full volume of air. Operation is said to be sensitive, requiring only light pressure of the foot on the pedal to open or close.

Large Inserted-Tooth Cutters

A NUMBER of advantages are claimed for large inserted tooth cutters which will be shown by the Farrel Foundry & Machine Co., Buffalo. It is said to be economical to make cutters from 24 to 2 D.P. from a solid high-speed steel blank, and all cutters from 1¾ D.P. upward, of the inserted tooth type. The larger cutters have cast steel or forged steel bodies and high-speed steel blades which are held securely in position by wedges and bolts. The cutting blades are roughed out to approximate tooth shape, are hardened, and are finish-ground in position on the body. They are, it is claimed, as accurate as a cutter made from one piece of steel.

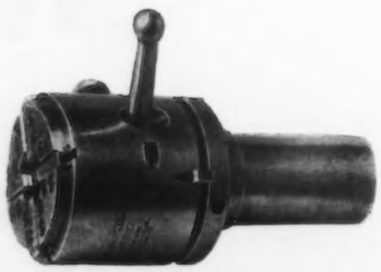


Ease of thoroughly and evenly hardening the comparatively small high-speed steel blades is an advantage claimed, as well as ease of replacement of the blades should one or two teeth become injured due to hard local spots in the material being cut. It is further pointed out that the cutters are economical because the body and the holding device are permanent and the cutter blades can be machined in large quantities, thereby conserving expensive material and reducing the cost of roughing.

New Stationary Self-Opening Die Head

A STATIONARY self-opening die head, designated as the style KH, will be shown for the first time by the Geometric Tool Co., New Haven, Conn. Although of different design than previous tools made by the company, the new die head takes the same type of chaser as do the style K and KD heads brought out by the company in 1925 and 1926. It is expected that this new tool will find favor among users of multiple-spindle automatic screw machines and other live spindle equipment. Simplicity is a feature emphasized. The only screws are those in the front plates and there are no complicated mechanisms required to open or lock the tool. It opens and closes axially, opening being accelerated by two straight springs. The locking mechanism consists of a pawl with broad contact surface. The chasers are rigidly backed up directly behind the cutting point by a heavy closing sleeve, with no intermediate parts to spring or wear. They are rigidly supported on both sides and bottom.

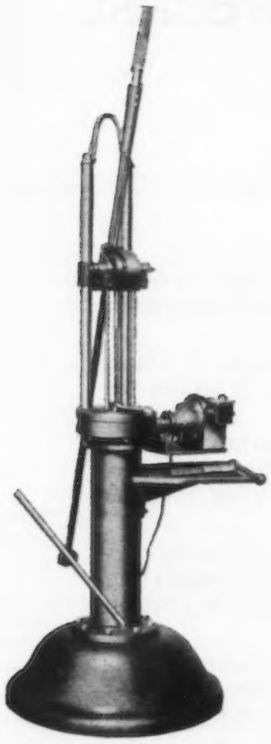
The tool is made of alloy steel, and all parts are hardened and ground. It is available in five sizes, with cutting range for straight threads from ⅛ in. to 3½ in., and for Briggs standard pipe threads from ⅛ in. to 3 in.



High Frequency Electrical Tools

INCREASE in power and production, less weight and longer life of drills and reamers are among the claims in connection with new high frequency, 180 cycle, electric tools to be displayed by the United States Electrical Tool Co., Cincinnati. This type of tool has an induction motor operating on 220 volts, 180 cycles, three phase, which is said to give a free or synchronous speed of 10,800 r.p.m. The inductive motor is stressed as eliminating commutators and brushes and as having a rotor which consists of laminated iron through which are inserted bare copper bars, short circuited together on the ends to eliminate armature trouble. The tools are ball bearing throughout. Significant reduction in maintenance cost is also claimed for these tools.

Power Scraper



HANDLED like a hand scraper, but having several times as much power back of each stroke, a new device has been put out by Anderson Brothers Mfg. Co., Rockford, Ill. It is to be exhibited at Cleveland for the first time. The machine is portable and particular claim is made for its flexibility. It may be handled by a crane or run on its own wheels to the place of use. The machine can be attached to an electric lamp socket. The motor is of ¼ hp.

Control for operating the scraper ram is said to be extremely sensitive—so much so that only 1/16 in. forward movement is needed to cause a forward stroke at the rate of 60 ft. per min. A reverse action causes the scraping ram to return at even higher speed. Manipulating the control is said to be as natural as hand scraping. The length of the stroke has a range from a fraction of an inch up to practically the whole length of the ram. The scraper arm has a working radius of 6 ft. and blades are quickly and easily removed for sharpening.

Wheels for Surface Grinders

INCLUDED in the exhibit of the Blanchard Machine Co., Cambridge, Mass., will be grinding wheels accurately graded for use with Blanchard surface grinders. The exhibit includes also the automatic surface grinder with washing attachment, the Blanchard reaming machine recently described in THE IRON AGE.

Three widths of wheels are standard, those for narrow surface, medium surface and broad surface. Each of these three is made for a variety of materials to be ground. Recommendations are covered as to the best wheel for average work, the fastest cutting and the finest finish under the different conditions of width of surface and material to be ground. The wheels are all silicate.

Each completed wheel, after being graded by accurate mechanical means, is marked with the grade, together with the grit and the type of wheel. All the wheels are cylinders designed to fit the Blanchard machine.

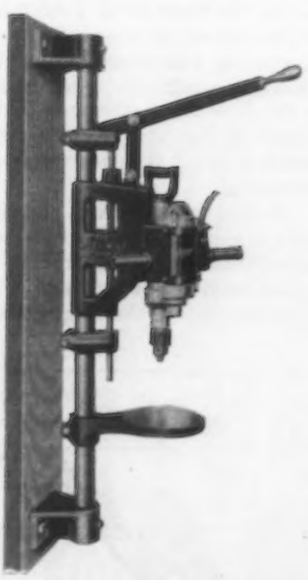
New Four-Spindle Gridley Automatic

IMPROVEMENTS intended to increase productive capacity have been incorporated in a new 1⅜-in. Gridley four-spindle automatic, which will feature the display of the National Acme Co., Cleveland. Except for the basic Gridley combination spindle carrier and turret design, the new machine departs considerably from the previous model. Full anti-friction spindles are a feature. Four bearings carry combined radial and thrust loads at the front of each spindle, while two bearings, arranged to float, are used at the rear of each spindle. Anti-friction bearings are also used at every other vital point.

Important changes have been made in the spindle carrier to permit the use of high speeds and high tool pressures. Changes in the stock-feed mechanism provide quicker and more positive feeding of the stock. New style cross-slides, said to be of unusual size, rigidity and power, have been designed. Threading in two positions (with the two upper spindles) without resorting to special attachments is now possible. A new splash system of oiling for the gear box, together with the anti-friction bearing mounted shafts, is claimed to permit the spindle speeds of the machine to be doubled. A pan with increased chip and oil capacity and which may be cleaned out rapidly from either end or either side of the machine is another feature. A continuous chip-removing mechanism based on the conveyor belt principle is incorporated in the pan. The problem of overheated cutting oil is solved in the pan design by immediately separating the cutting oil from the hot chips and then causing the oil to circulate about a large reservoir. Oil in the reservoir is cooled by contact with heat radiating surfaces before being pumped back to the work. It is claimed that by means of this arrangement the entire machine is kept cool under high-speed operation.

Electric Drill Stands

POST or wall drilling stands, as well as a bench drilling stand, for all sizes of its portable electric drills, will be among the new equipment featured by the Hisey-Wolf Machine Co., Cincinnati. The stands accommodate drills ranging



in capacity from ¼ to ⅞ in. The supporting bracket, and also both ends of the electric drill housing, are accurately machined to assure alinement of the drill in the stand. In mounting the drill in the stand, it is unnecessary to move any part of the machine.

Leather Belting Test Machines

TEST machines for various purposes will be shown by the Chicago Belting Co., 125 North Green Street, Chicago. These illustrate modern applications of belt transmission.

An operating exhibit will show application of belting on short-center drives with flexible idlers. A second operating exhibit will show comparative power transmission tests between open and idler type short-center drives. Together with these two exhibits will be a new tannage made for this type of drive, illustrating its application to machines operated by individual motors through the medium of leather belts.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Statistical Data Concerning the Chief Consuming Industries Indicate That:

1. Steel ingot production increased more than usual in August; remaining above the level of composite steel demand, it may prevent price recovery.

2. Trend in chief consuming industries appears to foreshadow a moderate recovery during the fall months.

3. Car and locomotive orders continue low, but may recover as traffic picks up.

4. Structural steel sales were far above the scale of building activity, and probably cannot hold such volume.

5. Exports increased in July and helped relieve the fear of over-production.

6. Sales of finished steel in the first seven months of 1927 were better even than in 1923, and indicate a higher total for the year than anticipated.

7. Automobile production is slack, but slightly more activity is looked for later on.

8. General manufacturing activity, outside steel and automotive industries, has shown a recession, but remains above normal.

9. Oil production and mining activity, which earlier were supporting the steel business, have been in a slump since March.

10. Farm purchasing power is better, as incomes are higher than last year and the dollar will buy more.

OUR "composite demand line" fell rather sharply in July, reaching in that month the lowest point since November, 1924. This means that the activity in the chief lines of steel consumption was the lowest in over two years and that requirements for replacement and ordinary use must have been proportionately reduced. The chief factors in the July decrease in indicated demand were declines in railroad freight traffic and in automobile production. Exports of iron and steel were the only item to show an increase of any importance.

On the other hand, production of steel ingots, while it also showed a downward trend, was not reduced so greatly as was the potential demand for steel. This condition results in a continuation of a shaded area in the first chart—the area that means a production in excess of indicated current requirements. While the excess is small, it appears sufficient to keep prices from advancing.

In August, moreover, the ingot output increased a trifle more than usual, which to our way of thinking is unfortunate and must tend to delay further any sustained recovery in prices.

What then of the August demand for steel, and the outlook for the near future? A brief analysis of the chief components of the composite demand index gives the following results:

Railroads. Our adjusted index of railroad freight traffic in July fell to the lowest point of the year and was only 6 per cent above the average of the five years, 1921-1925. This, however, was partly due to the large number of Sundays in July. Our estimate for August indicates a recovery in freight traffic which was of greater than seasonal proportions, and which carried the figure to a point 21 per cent above the five-year average. The tonnage curve has reflected the summer recession in business and its decline explains the small volume of orders for railroad equipment. Now, however, a moderate gain that will be of at least seasonal proportions seems probable for the fall months. As the carriers have bought so little this year, they will probably furnish a fair volume of orders to the steel producers.

Building. The square feet of floor space in building contracts awarded, allowing for seasonal conditions in July, fell to the lowest point of the year, excepting only May. Building permits also have declined rather steadily. The value of all building contracts, however,

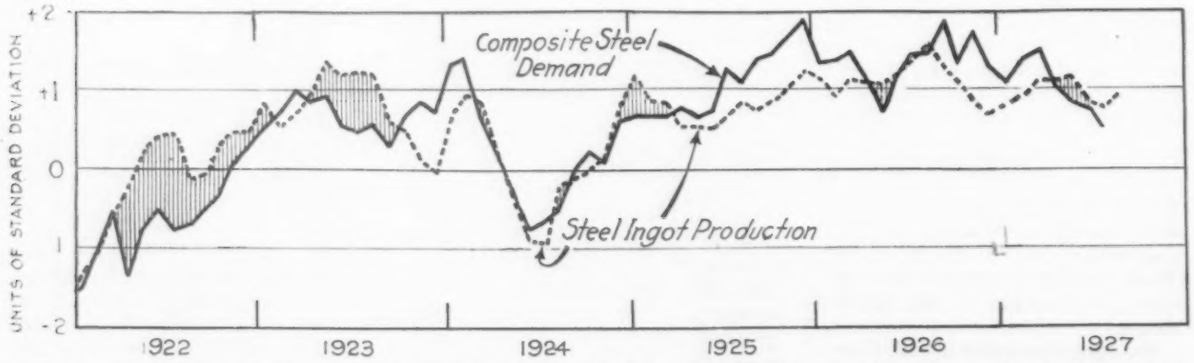


Fig. 1—Steel Ingot Production, Adjusted for Seasonal Variations, Continues Above Demand and May Keep Prices from Advancing. A little less activity than a year ago is indicated

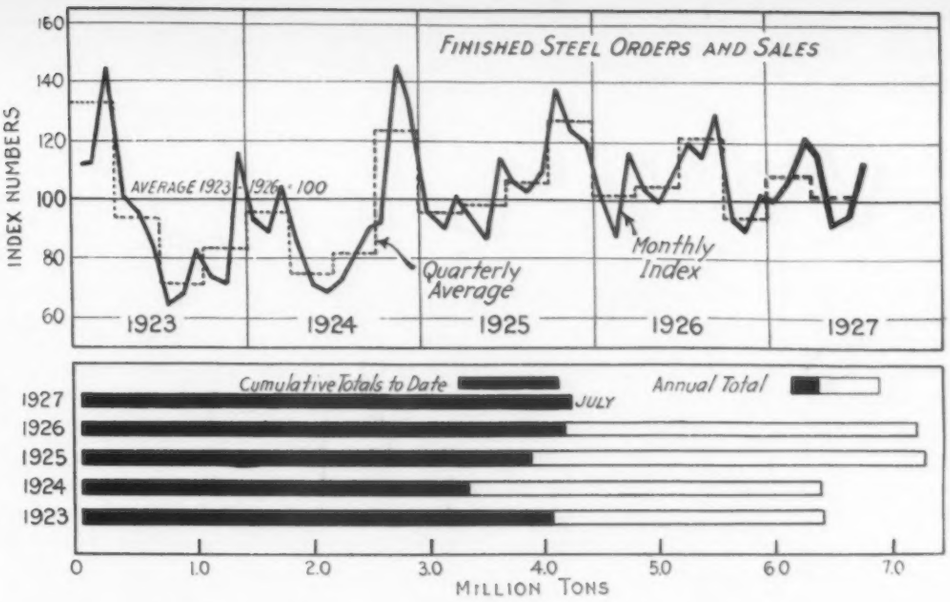


Fig. 2 — Finished Steel Orders and Sales Showed a Sharp Rise in July. First seven months' business is estimated as ahead of both 1926 and 1923, but this lead may not continue

including engineering construction, such as bridges, public works, etc., has been very large, and, stimulated by easy money, will probably continue so. August contracts (sq. ft.) held about level, adjusted for the seasonal factor, and contemplated new construction declined only a little. The continued decline in residential construction is affecting unfavorably the demand for nails, various kinds of pipe, sanitary ware and the like, but structural steel as a whole continues to meet a fairly large demand.

Automobiles. Automobile production fell to the low level of 274,400 cars and trucks in July, which is a very poor showing for the season. Employment in Detroit and some other motor centers has recently declined. The Ford situation is still a drag on the industry and it now seems likely that this situation will not be cleared up for another 30 days, at least. Nevertheless, sentiment among the leaders of the industry appears to be rather optimistic and in our opinion moderate gains lie ahead.

Manufacturing (excluding iron and steel and automobiles). General manufacturing activity declined in July, but even so was a little above normal. It seems doubtful if the further recession likely to appear in August and September figures will carry the general level much below normal and accordingly a continued good miscellaneous demand for iron and steel is probable. In this connection we note that orders for machine tools continue disappointing. Allowing for seasonal variation, such orders have since February been rather stable at the lowest level since 1924. The continued fair volume of manufacturing and the very easy condition of the money market, together with the rise in our P-V line (a general barometer of business), warrant the opinion that the machine tool business will pick up materially by October.

Mining and Oil. Mining activity, like most other lines of industry, declined a little in July, notably in the case of anthracite coal, copper and petroleum. Bituminous coal, however, was an exception to this trend, and it is the most important item. Demand for soft coal for domestic use has begun to show seasonal improvement and indications are not lacking that an adjustment of the strike situation is making progress in certain districts, as in Illinois. Coal production, therefore, may be expected to increase materially and to result in an improved specifying of light rails and other mine equipment. Production of petroleum is (unfortunately) still increasing. This has resulted in some considerable demand for plates for storage tank purposes. Such over-production, however, is holding back the oil industry. Meanwhile, drilling activity,

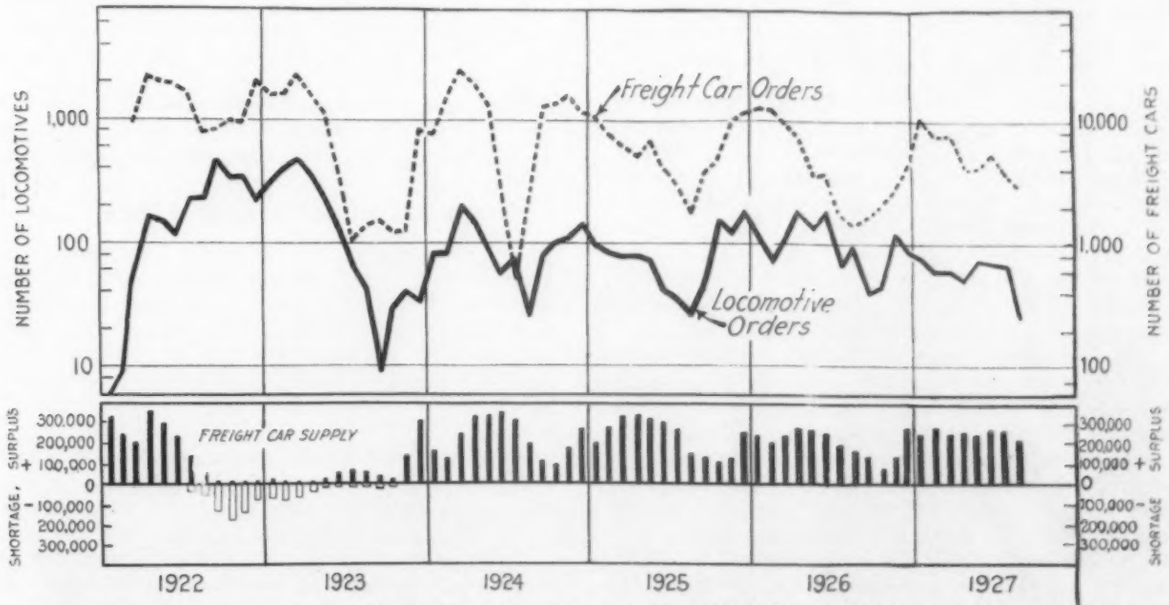


Fig. 3—Locomotive and Car Orders Continue to Drag and Unfilled Orders Declined to the Lowest Point in Years. Both curves are plotted as a 3-month moving average

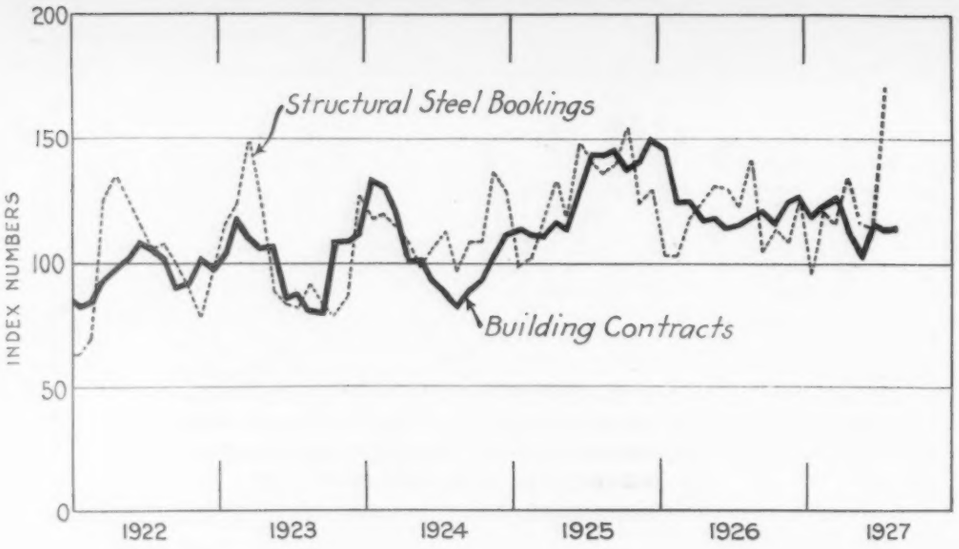


Fig. 4 — Building Construction Continues at a Rate Which Probably Cannot Be Much Longer Maintained. Structural steel lettings, high in July, are likely to decline sharply

eliminating the merely seasonal changes, has fallen to the lowest point in a good many years—lower even than in October, 1921.

Agriculture. The farm situation is moderately favorable. Thus far this year the farmers have not been receiving a total income that can be called satisfactory, for it may be estimated as only about the same as that received in 1925 and 1926. But the purchasing power of each dollar received by the farmer is greater. The situation finds expression in a sharp rise in mail order sales and in improved activity on the part of the farm implement makers.

Exports. Contrary to the usual trend, exports of iron and steel increased a little in July and were a material factor in relieving the domestic market from the pressure of over-production. We continue of the opinion, however, that exports of iron and steel are not a factor in strengthening prices. Present indications are that foreign competition is increasing and that our steel makers can hold their place in the world markets only with considerable effort, and probably at price concessions during the near future.

The upshot of this survey is that the outlook for the steel industry during the next few months may be rated as "fair." We have forecast moderate improvement for the fall months and an examination of the activity in the chief consuming industries indicates that the demand on their part will be sustained, or show moderate gains.

Fall Recovery Indicated as Probable

JULY figures covering the orders and sales of some of the chief kinds of finished steel show indications of the possibility of a fall recovery in the industry. Certainly such figures prove that the steel business is far from dead. There was a sharp rise in July, in spite of the fact that this month had only 25 working days, which brought the total well up to the April level and was 13.5 per cent above the average for the four years, 1923-1926. Excepting July, 1926, this is the highest figure for the month in any recent year.

We estimate that the total orders and sales during the first seven months of 1927 were slightly ahead of those for the same period last year, as well as those for 1923.

An examination of the figures in more detail, however, deprives the foregoing statements of a part of their optimistic tone. In the first place, the rise occurred chiefly in structural steel, July having been the record month. This was obviously due to some unusually large lettings in the first half of the month and it does not seem likely that the situation will be repeated often. In fact, trade reports show a lower weekly average for August. The bookings of fabricated steel plates (51 firms) usually decrease in July. This year, however, the July bookings increased, rising from 28,831 tons in June to 35,320 tons. While this is encouraging as to trend, the figure is below that of July last year and far under July, 1923. Sheet sales also increased in July, but this is not unusual and the figure was far below that for July, 1926.

While little, if any, gain seems probable in the total orders and sales in August, it must be admitted that the July showing was good and makes it seem more probable that the volume of business for the year will hold up better than seemed likely a month ago. If only production were a little moderated, the sales results would seem quite satisfactory to the steel makers.

Equipment Buying at a Low Ebb

RAILROAD buying continues to drag. Last month the carriers ordered only about 20 locomotives and 1066 freight cars. These figures are below those for July, and in the case of locomotives much lower than a year ago, bringing unfilled orders to the lowest point in years, at 363. It is apparent, however, that in each recent year there has been a summer slump in equipment buying and that in several of these years the equipment order curves have fallen lower than they now are. Each year a recovery has occurred in the autumn months. Freight traffic increased in August this year and it will probably reflect the improvement in business that we anticipate for September and October. This will mean both a need of steel by the railroads and possession of revenues with which to pay for it. It thus seems reasonable to expect a fair seasonal gain in equipment buying during the last quarter.

Construction Continues at a High Rate

IN the fourth chart are shown the most recent data concerning structural steel bookings and building contracts. Measured in floor space, building contracts awarded in August showed almost exactly the usual seasonal gain of about 7 per cent, our adjusted index for the month being 113.3, which compares with 113.2 in July and 117.9 a year ago (the average for 1921-1925 being 100).

Compared with building contracts, the bookings of structural steel were phenomenally high in July. As past records show that there is a rather close relationship between such bookings and the building contracts, it hardly seems possible that so high a level can be maintained. Judging by the past, the bookings are likely to fall back rather sharply toward the level of the contracts curve.

New Alloy Bar Mill at Chicago

Guarding the Quality of the Steel and Rolling to Commercially Exact Dimensions Prime Considerations in Laying Out and Equipping Plant

TO attain quantity production of a quality product and, at the same time, to meet the increasing demands of the trade for prompt deliveries was the aim of the Illinois Steel Co. in building a 12 and 16-in. alloy steel bar mill at its South Works, Chicago. Recently put into operation, the new mill will roll some carbon steel of special quality and dimensions, but it was designed primarily for the production of alloy steel sections.

The general layout provides ample space for all stages of manufacture, and the routing of work, which includes a variety of sections, is an excellent example of straight-line progression. The equipment commands attention for its completeness and its adaptation to unusual requirements in precision and care in turning out products to commercially exact dimensions, made to close chemical specifications, free from surface imperfections and possessing definite physical properties. From the billet dock to the shipping room precautions are taken to maintain the identity of the steel from each bloom or billet. Both at the beginning and end of the manufacturing cycle the steel is given careful inspection and appropriate treatment. At the billet dock there are chipping hammers and grinders, as well as pickling equipment. In the shipping room final chipping, grinding or polishing is done and heat treatment is provided in furnaces, cooling chambers, quenching tanks and a lead drawing bath.

To protect the steel from scale and surface decarbonization, combustion in the billet heating furnaces is kept as non-oxidizing as possible.

Flexibility has been insured for the mill by providing a separate variable speed, direct current motor for each of the 13 stands. Through these motors the rolling speeds may be closely regulated to suit the physical character of the various grades of steel. An absence of continuous passes is a notable feature of the mill, and unusually heavy roll stands assure uniform sections. To prevent scratching, the mill tables are provided with high cast iron sideguards, with vertical rollers where required. In the rolling of spring steel on the 12-in. mill a novel combination sideguard and vertical roll is used to prevent variation in the finished bar size and to maintain concavity in an absolutely central position.

A bar piling device on a hot bed for light sections permits retarded cooling for products requiring stack annealing, such as spring steels, which must be kept free from excessive scale and sufficiently soft for cold shearing and punching.

A new chemical, physical and metallurgical laboratory will be used for developing improved production methods and for research into the physical properties, structure and heat treatment of steels.

Heating Furnaces Designed to Produce Minimum Quantity of Scale

The mill structure, excluding external auxiliary buildings, occupies an area of 206,675 sq. ft. Approximately 2100 ft. from the bar mill billet dock is a new 40-in. electrically driven blooming mill, where blooms of the required dimensions are rolled from electric or open-hearth ingots. The semi-finished steel is transported from the blooming mill by a narrow-gage railroad. The bar mill billet dock, which has an active floor area of 45,900 sq. ft., is served by two overhead 10-ton electric cranes. The bloom and billet-conditioning equipment, consisting of inspection beds, chipping hammers, grinders, etc., is of the usual type. Lead-lined acid pickling and washing tanks are provided to accommodate blooms, billets and bars up to 30 ft. in length. A large area has been provided as a working floor and for the storage of conditioned blooms to facilitate the execution of an elaborate program for check-

VIEW of Mill Building with End of Reheating Furnaces in Right Foreground. Stands Nos. 9, 10, 11 and 12 are equipped with looping floors as well as mill tables, as may be noted at the left

ing and maintaining the identity of each bloom or billet throughout all steps of manufacture. Natural, as well as artificial, lighting arrangements are such as to permit the closest inspection.

At the south end of the billet dock are located charging platforms, billet-charging machines and furnace pushers for two continuous, producer gas fired, recuperative heating furnaces. The furnaces are of the closed-end type, with side-charging and side-discharging doors, and are designed for slow, thorough and careful heating up to, but not exceeding, the specified rolling temperature. The furnaces have an effective hearth length of 54 ft. and a width of 13 ft. The rated capacity of each furnace is 360 tons per 24 hr. At the discharge end and immediately adjoining the lower ends of four water-cooled skid pipes, a refractory-floored soaking hearth, 8 ft. long, is provided. In this portion of the furnaces the blooms or billets are held, not in direct contact with the furnace gases and flames, but exposed to the heat as reflected from the raised roof until they are evenly heated and until all skid pipe black spots are eliminated. In all phases of heating, combustion may be characterized as relatively non-oxidizing, and this condition is diligently maintained in the interest of producing the minimum quantity of scale and of surface decarbonization. The required quantity and quality of producer gas for the operation of the furnaces is supplied by two gas producers of the full mechanical type, 10 ft. in inside diameter, each of which has a rated capacity of 4000 lb. of coal per hour. A third producer is provided as a spare.

Mill Arranged and Motored to Handle a Variety of Sections

The discharge ends of the heating furnaces reach into the mill building proper, which is 100 x 552 ft. Five of the variable speed, direct current motors that drive the mill's 13 roll stands are directly connected with the pinions of their respective stands, while on the remaining eight drives suitable reduction gear units are interposed between the motors and the mill pinions. Direct current is supplied to the mill motors normally at 600 volts by two synchronous motor generator sets. Mill stands Nos. 1, 2, 3 and 4 are arranged in tandem and have rolls 18 in. in pitch diameter and 40 in. long. After passing stand No. 4, the bars run in the opposite direction through stands Nos. 5 and 6, which also are in tandem and have rolls 16 in. in pitch diameter and 36 in. long. After passing stand No. 6, the direction of rolling is again reversed, and the bars proceed through stands Nos. 7, 8 and 9A, which are in tandem and have rolls 16 in. in pitch diameter and 36 in. long. No. 9A is the finishing stand for the larger sections produced by the mill and delivers bars to a hot saw and to a cooling bed of the balanced rocker type, 28 x 100 ft. Shuffle bars and runout tables bring the product from the hot bed to the mill shear, which is of unusually heavy and rugged design and equipped with electrically operated shear table stops and bundling scales. In this way provisions have been made to furnish bars in various lengths by either hot sawing or hot shearing, or by subsequent cold sawing.

Bar Piling Device Provided for Products Requiring Stack Annealing

When rolling lighter sections stand No. 9A is not used and the bars are transferred from stand No. 8 to four stands of rolls, 12 in. in pitch diameter and 24 in. long, which are arranged in a staggered formation. These four stands are equipped with mill tables as well as looping floors, so that either arrangement may be used as required by the class of product being rolled. From the 12-in. rolls the bars are delivered to a rocker-type cooling bed, 20 x 300 ft., which is provided with a bar-piling device to permit the retarded cooling of products that require stack annealing. This feature is of special importance in rolling spring steels, which must be kept free from excessive scale and sufficiently soft to permit cold shearing and punching.

From the hot bed the products travel over shuffle bars and runout table to the mill shear, which is identical in equipment with the shear for the 16-in. mill. An added feature of the 12-in. mill hot bed is that it is equipped with coiling facilities capable of handling a maximum range of sizes in rounds, squares and flats.

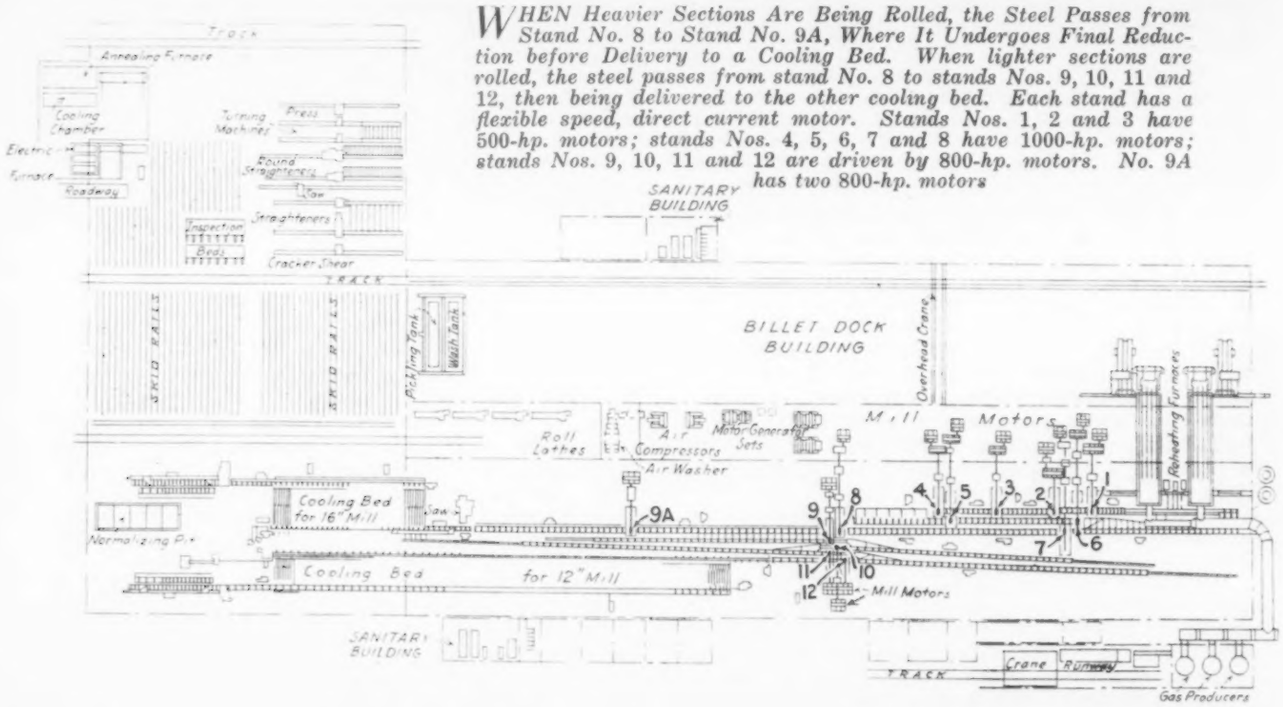
The mill building is served by two 20-ton overhead electric cranes.

Range of Sizes Rolled

The range of sizes which the mill is now equipped to furnish is approximately as follows: Rounds, from ½ to 4½ in. in diameter; square-edge or round-edge flats, from 1 x ½ in. to 9 x 2½ in.; round-edge, concave overall, spring steel flats, from 1½ in. x No. 6 Birmingham wire gage to 5 x 7/16 in.; round-corner squares, from 1½ to 3⅞ in. Additional sections, within the rolling ranges indicated are in course of preparation.

Upon leaving the mill shears or saws all products are carefully marked for identification and transferred by cranes to the finishing and inspection departments. For all classes of products that require a slower rate of cooling than can be obtained on the hot beds, an insulated cooling pit of 150 tons capacity is provided.

WHEN Heavier Sections Are Being Rolled, the Steel Passes from Stand No. 8 to Stand No. 9A, Where It Undergoes Final Reduction before Delivery to a Cooling Bed. When lighter sections are rolled, the steel passes from stand No. 8 to stands Nos. 9, 10, 11 and 12, then being delivered to the other cooling bed. Each stand has a flexible speed, direct current motor. Stands Nos. 1, 2 and 3 have 500-hp. motors; stands Nos. 4, 5, 6, 7 and 8 have 1000-hp. motors; stands Nos. 9, 10, 11 and 12 are driven by 800-hp. motors. No. 9A has two 800-hp. motors



LOOKING Toward the Reheating Furnaces, with Stand No. 8 in the Middle Background. To prevent scratching, high cast iron sideguards have been provided on the mill tables

The finishing, inspecting, shipping and warehouse divisions of the mill occupy 74,450 sq. ft. and are located at right angles to the mill and hot beds. The two buildings comprising these divisions are served by overhead electric cranes, each of which is equipped with two 5-ton trolleys. The equipment provided for the final conditioning and inspection includes, in keeping with the rolling range of the mills, straightening machines for rounds, flats, squares, etc., round-turning machines, a "cracker cut" shear, and oil-cutting, non-friction cold saws.

Facilities for Heat Treating and Annealing Bars

Facilities have been provided for annealing and normalizing bars, etc., up to 30 ft. in length and for heat treating material up to 12 ft. in length. The heat treating is done in an electric furnace of the car type, while for annealing a gas-fired car-type furnace has been provided. Supplementing the furnaces are cooling chambers, quenching tanks for horizontal and vertical quenching in oil or water, a lead bath for drawing, etc., all equipped with the latest type of temperature control instruments and appliances.

In the warehouse are also located the final inspection beds. Additional beds of liberal dimensions are provided for final chipping, grinding or polishing, to permit a careful, bar for bar, handling of all high-grade products and to positively eliminate "mixed steel."

Special Mill Laboratory Provided

The rapidly increasing use of alloy and special grades of carbon steels has emphasized the need for amplified knowledge not only of the methods of production but also of the characteristics and the reliability of the material produced. To this end the existing chemical, physical and metallurgical laboratory facilities at South Works are being enlarged by the provision of a new department, which initially will occupy 14,500 sq. ft. of active floor area. This laboratory will be equipped and manned to conduct the usual investigations pertaining to the betterment of production methods and, in addition, to make a thorough study of all matters relating to physical properties, structure and the heat treatment of steels.

The facilities and the staff of this department will also be available to extend to customers technical or practical assistance pertaining to their shop practice or to development work.

THE Mill Has Two Cooling Beds, One (at the Left) for Heavier Sections and the Other for Lighter Sections. Equipment for coiling light material has also been supplied

CHROMIUM ALLOY STEELS

New York Steel Treaters Hear Doctor Mathews Discuss Chromium in Steel Metallurgy

STEEL treaters in New York and vicinity inaugurated the 1927-1928 series of meetings Monday evening, Sept. 12, with one of the largest gatherings in the history of the New York Chapter of the American Society for Steel Treating. A largely attended dinner preceded the meeting. An address, which was impressive in its clarity, on "The Importance of Chromium in Alloy Steel Metallurgy," was delivered by Dr. John A. Mathews, vice-president Crucible Steel Co. of America, New York. Doctor Mathews is a member of the New York chapter and one of the honorary members of the national society.

The speaker referred briefly to the early developments in the use of alloys, including the work of Berthier, Faraday, Mushet, Hadfield and Riley, leading up to the present time, which may be referred to as the "Alloy Age" as distinct from the "Iron Age" of earlier years.

After defining alloy steels, brief consideration was given to the subject of pure iron and its critical points and the effect of carbon on iron. The changes brought about broadly upon the iron-carbon critical points by the introduction of metallic elements were then considered. The specific effects of elements such as nickel, manganese and silicon were dealt with by means of contrast to the influence of chromium, which was the principal subject under discussion.

It was pointed out that chromium has a broader field of usefulness than any of the other alloying elements, since it is useful in amounts up to 60 per cent and with carbon contents over a very wide range, in some cases up to 3 per cent. Within this very broad field there are numerous patented and commercial alloys of industrial importance.

Only a few of these were discussed in detail, including steels of the chromium magnet and chromium hot work types, which are of about the same composition, stainless irons and steels from 8 to 30 per cent of chromium, and finally, the high-carbon, high-chromium die steels, which have attracted a good deal of attention of late, containing over 2 per cent of carbon and about 12 per cent of chromium.

The hardening characteristics of these different types were dealt with, particularly as illustrating the influence of retained austenite, which subject Doctor Mathews has discussed on several occasions, notably in the Howe Memorial Lecture for 1925. The importance of the question of retained austenite was emphasized in explaining many of the peculiar features which arise in the heat treatment of various chromium alloys. The discussion was limited to the simple iron-carbon-chromium alloys, as this subject in itself is so vast as to preclude covering the more complicated alloys in which chromium is one of the elements.

Some British Opinions

After the address, F. C. A. H. Lantsberry, William Jessop & Sons, Ltd., Brightside Work, Sheffield, England, who is spending several months in this country, testified to his admiration of Doctor Mathews' address and stated that in England the chromium magnet steels had not gained such widespread use as they have in this country, and it was his opinion that the tungsten magnet steels were superior, to which Doctor Mathews later generally agreed.

Mr. Lantsberry conveyed the interesting information in reference to the medium manganese steels that locomotive driving wheel centers are being made in England today of steel castings containing around 1.50 to 2 per cent manganese. William J. Priestley, vice-president Electro Metallurgical Sales Corporation, New York, stated that his experience in hardening armor plate some years ago bore out some of the facts advanced by Doctor Mathews regarding the effect of mass on the hardening of certain alloy steels containing chromium.

Iron and Steel Institute Program for Fall Meeting

Fifteen technical papers are to be presented at the annual fall meeting of the Iron and Steel Institute, to be held this year in Glasgow, Scotland, at the Royal Technical College, Sept. 20 to 22. The program is as follows:

"High-Frequency Induction Melting," by D. F. Campbell.

"Magnetic and Other Changes Concerned in the Temper-Brittleness of Nickel-Chromium Steels," by H. A. Dickie.

"The Influence of Cold Rolling and Subsequent Annealing on the Hardness of Mild Steel," by C. A. Edwards and K. Kuwada.

"The Influence of Nickel and Silicon on an Iron-Carbon Alloy," by A. B. Everest, T. H. Turner and D. Hanson.

"The Effect of Varying Ash in the Coke on Blast Furnace Working," by C. S. Gill.

"The Constitution of Silicon-Carbon-Iron Alloys, and a New Theory of the Cast Irons," by D. Hanson.

"The Work-Hardening of Steel by Abrasion," by E. G. Herbert.

"On the Quantitative Measurement of the Cutting Power of Cutlery," by K. Honda and K. Takahasi.

"The Use of Silica Gel as a Medium for Drying Blast," by E. H. Lewis.

"The Mechanism of Tempering of Steels," by T. Matsushita and K. Nagasawa.

"The Economic and Social Development of the American Iron and Steel Industry," by T. W. Robinson.

"The Behaviour of Mild Steel under Prolonged Stress at 300 Deg. C." by W. Rosenhain and D. Hanson.

"A Testing Machine for Repeated Impact, and a Preliminary Investigation on the Effects of Repeated Impact on Lowmoor Iron," by J. H. Smith and F. V. Warnock.

"The Solution of Carbon in Alpha-Iron and its Precipitation," by J. H. Whiteley.

"A Contribution to the Theory of the Blast Furnace Process," by F. Wüst.

The paper by T. W. Robinson, vice-president Illinois Steel Co., Chicago, on the economic and social development of the American iron and steel industry, will be delivered Sept. 20. Visits to steel and iron plants in and near Glasgow have been arranged.

Plans Perfected for Next Week's Conventions at Detroit

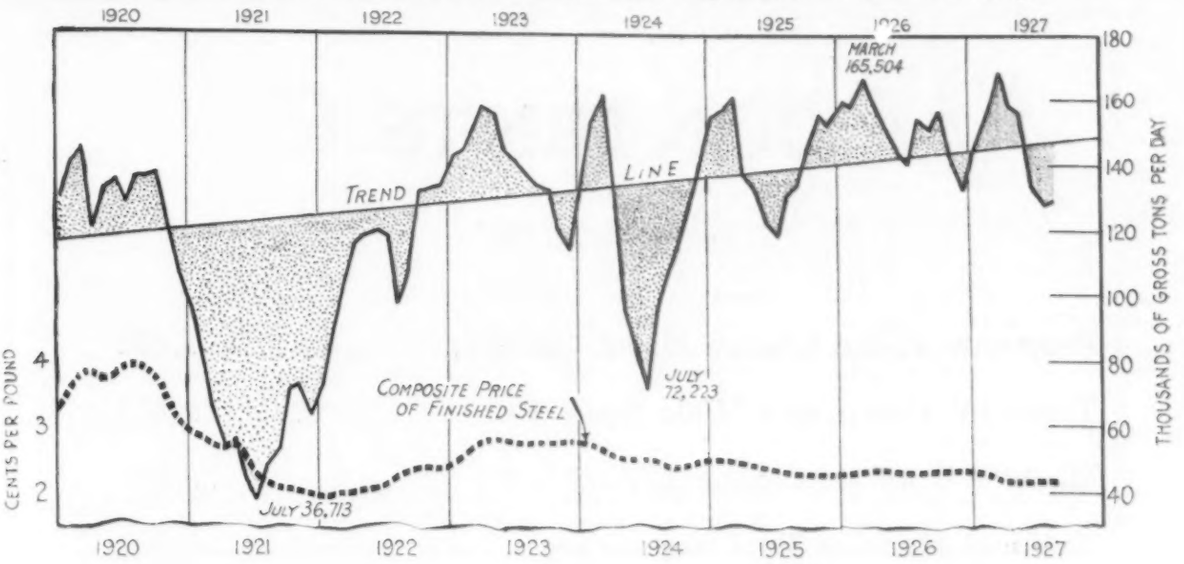
DETROIT, Sept. 13.—Some idea of the magnitude of the ninth annual National Steel and Machine Tool Exposition, which will open in Detroit next week for a five-day display, can be gained from figures made public by W. H. Eisenman, secretary of the American Society for Steel Treating and manager of the exposition. He announces that displays set up by 300 exhibitors will occupy over 93,000 sq. ft. of floor space and will require 3000 hp. for the motors, furnaces and other apparatus to be shown in operation.

Machinery and equipment on display will be worth well over $1,000,000 and will cost more than $700,000 to transport and install. Represented at the exposition will be industries whose total capital investment runs to $5,000,000,000, whose annual production totals $15,000,000,000 and whose employment lists number more than 1,000,000 men. Approximately 10,000 sq. ft. will be devoted to the cutting and welding demonstrations under the auspices of the American Welding Society.

Because three technical societies are to hold conventions simultaneously with the A.S.S.T., the week has been designated a "National Metal Week." The technical programs for the various conventions were published in THE IRON AGE as follows: A. S. S. T., Aug. 4, page 272; American Welding Society, Aug. 18, page 440; Institute of Metals, Aug. 25, page 486; Society of Automotive Engineers, Sept. 1, page 600.

Engines and water-wheels were made in the United States in 1925 in 220 establishments, which is less than one-half the number engaged in 1914. The number of wage earners, at 51,099, was greatly above the number in 1914.

Production of Steel Ingots in August Made the First Upturn Since March. It still remains below the line representing the long-time trend of consumption, but may usher in the autumn recovery



Slow Upturn in Ingot Production

Daily Rate of 128,552 Tons Was 1.1 Per Cent Above July — Eight Months, 4 Per Cent Under Last Year

PRODUCTION of steel ingots in August made the first monthly increase since last March, according to returns of the American Iron and Steel Institute. Calculated monthly production of open-hearth and Bessemer steel is reported at 3,470,903 gross tons, which compares with July's total of 3,178,342 tons. Production in August, 1926, was 3,986,966 tons, in which crucible and electric steel ingots to the extent of perhaps 30,000 tons were included. These smaller tonnages are not covered in the current figures.

With 27 working days, the August production represented 128,552 tons a day. This compares with 127,134 tons for each of the 25 days of July. Both open-hearth and Bessemer steel shared in the gain, but Bessemer made a much heavier recovery than did open-hearth. In August the open-hearth tonnage, as shown in the table, represented an increase of 8 per cent over July, while the Bessemer tonnage showed a gain of 15.8 per cent.

For the first eight months of the year calculated production stands at 30,267,686 tons. This is a decline of 4.7 per cent under the 31,775,768 tons produced in the first eight months of 1926. About 235,000 tons of this apparent decline, however, represents crucible and electric steel ingots, which are not reported this year. These would reduce the real decline to about 4 per cent. If we estimate the production from these small sources at 850 tons a day at this time, the total daily production would figure out at about 129,400 tons for August, against 153,345 tons per day in August, 1926.

Details of the last 20 months are shown in the table.

Production of Steel Ingots

(Gross Tons)

Months	Reported by Companies Which Made 95.40 Per Cent of the Steel Ingots in 1926		Calculated Monthly Production All Companies	Approximate Daily Production All Companies
1927	Open-Hearth	Bessemer		
Jan.	3,041,233	545,690	3,759,877*	144,611*
Feb.	3,042,232	565,201	3,781,376*	157,557*
March	3,701,418	590,716	4,499,092*	166,633*
April	3,340,852	565,634	4,094,849*	157,494*
May	3,272,810	557,683	4,015,192*	154,430*
June	2,822,477	486,047	3,468,055*	133,387*
July	2,595,692	436,446	3,178,342*	127,134*
Aug.	2,805,657	505,584	3,470,903*	128,552*
8 Months	24,622,371	4,253,001	30,267,686*	146,221*
1926				
Jan.	3,326,846	581,683	4,132,210	158,931
Feb.	3,023,829	556,031	3,785,051	157,710
March	3,590,791	635,680	4,468,617	165,504
April	3,282,435	601,037	4,105,799	157,915
May	3,201,230	516,676	3,927,979	151,076
June	3,036,162	498,764	3,734,153	143,621
July	2,911,375	526,500	3,634,993	139,807
Aug.	3,145,055	627,273	3,986,966	153,345
8 Months	25,517,723	4,543,644	31,775,768	153,506
Sept.	3,089,240	612,588	3,913,383	150,515
Oct.	3,224,584	630,526	4,074,544	156,713
Nov.	2,915,558	592,239	3,705,744	142,529
Dec.	2,788,479	493,172	3,466,766	133,337
Year	37,535,584	6,872,169	46,936,205	150,920

*Excluding crucible and electric ingots.

Lake Ore Movement Light in August

Shipments of Lake Superior iron ore from upper Lake ports in August were 8,775,990 gross tons, a decrease of 1,933,270 tons or 18.05 per cent from the 10,709,260 tons in August, last year. The season's shipments to Sept. 1 were 35,156,495 tons, also a decrease from last year; to Sept. 1, 1926, the total was 35,609,152 tons, making the falling off this year 452,657 tons or 1.27 per cent. The shipments by ports and for the season in 1927 and 1926 are as follows in gross tons:

Port	August, 1927	August, 1926	To Sept. 1 1927	To Sept. 1 1926
Escanaba	978,799	1,042,416	3,772,445	3,788,024
Marquette	555,588	623,776	1,961,234	2,054,462
Ashland	996,668	1,347,519	4,359,222	4,570,573
Superior	2,586,591	3,250,086	9,901,363	9,989,858
Duluth	2,657,539	3,364,322	11,221,286	11,309,971
Two Harbors	1,000,805	1,081,141	3,940,945	3,896,264
Total	8,775,990	10,709,260	35,156,495	35,609,152
Decrease	1,933,270		452,657	

Of the season's shipments Duluth's percentage was 31.92 per cent this year as contrasted with 31.76 per cent last year. Great Northern's proportion was 25.10 per cent this year against 24.98 per cent last year.

More than 90 per cent of the workers employed in the foundry of the Allith Prouty Co., Danville, Ill., have accepted the company's offer of cooperative group insurance. The program provides for some $350,000 of life insurance, as well as weekly benefits under a health and non-occupational accident policy.

CONTENTS

September 15, 1927

Proposals at the Geneva Naval Conference.....691

Trumbull Company's Wide Strip Mill 693

Machine Tool Replacement Vital 697

National Machine Tool Exposition 701

Exhibits at National Machine Tool Exposition 702

New Alloy Bar Mill at Chicago.....729

French Tariff Called Discriminatory 739

To Formulate a Platform of American Industry 700
Fluorspar Company Organized..... 700
Chromium Alloy Steels Discussed..... 732
No Merger Involving Steel Corporation. 756
Chairmen of Steel Treaters Technical Sessions at Detroit..... 759

MEETINGS

National Machine Tool Builders' Association 701, 732
Iron and Steel Institute (British)..... 732
American Foundrymen's Association... 738

STATISTICAL

Slow Upturn in Ingot Production..... 733
Lake Ore Movement in August..... 733
British Iron and Steel Output..... 747
Steel Corporation Unfilled Orders..... 756

DEPARTMENTS

Business Analysis and Forecast..... 726
Editorial 736
Iron and Steel Markets..... 740
Comparison of Prices..... 741
Prices, Raw and Finished Products..743-745
Non-Ferrous Metals..... 757
Structural Awards and Projects..... 758
Railroad Equipment Buying..... 759
Reinforcing Steel Business..... 759
Personals 760
Obituary 761
European Steel Markets..... 762
Machinery Markets..... 771

Advertiser's Estimate of the Pre-Convention Issue

IT cost $64 to mail the plates for one of the advertisements in this issue. Owing apparently to delays in completing the cuts, resort was had to the air mail to insure arrival of the cuts in time and in addition they were sent by special delivery so there would be a rushing of the package as soon as the airplane landed. The wrapping was surely picturesque, being plastered on both back and front with 20, 30 and 50-cent as well as $1 stamps. Clearly the Government sending office must have been left with a temporary shortage of postage of $1 and 50-cent denominations, or else it would not have been necessary almost to hide the superscription.

The incident is an illustration of the value placed by a manufacturer in being represented in the issue and is calculated to increase the reader's regard of his own importance from the advertiser's standpoint.

This Issue in Brief

"Million dollar machine shop" to get into production in Cleveland on Monday. A record in simultaneous exhibition of new developments in machine tool equipment will be established with the opening of the first National Machine Tool Exposition. —Page 701.

Manufacturers will lay down a definite platform for the guidance of political parties. The heads of 100 leading American manufacturing firms will meet under the auspices of the National Association of Manufacturers to crystallize opinion on matters concerning the welfare of the nation.—Page 700.

When is a piece of manufacturing equipment obsolete? (1) When it will no longer produce sufficiently accurate work; (2) when repairs are excessive; (3) when a more modern machine will produce substantially more than the one in use.—Page 697.

Single pair of roller bearings weighs 56½ tons. Massive bearings on new Trumbull strip mill have a load capacity of 1,000,000 lb.—Page 694.

Recovery in steel prices may be delayed by increased ingot output, says Dr. Haney. Production appears to be in excess of current requirements, economist believes.—Page 726.

Non-oxidizing combustion is striven for in heating furnaces connected with new alloy bar mill. That scale and surface decarbonization may be kept to a minimum, blooms or billets are protected from direct contact with furnace gases and flames. —Page 730.

Steel ingot output shows slight gain. August daily rate was 128,552 tons, 1.1 per cent above July, but 9 per cent under July, 1926.—Page 733.

How soon should a new machine pay for itself to warrant its purchase? Automobile makers say first year's earnings should equal the cost of the machine. Other manufacturers allow from four to five years.—Page 698.

Building of cruisers, submarines, and other naval auxiliaries is unchecked. Unwillingness of foreign powers to limit the building of auxiliaries, through an international agreement of the nature of that applying to battleships, does not strengthen sentiment for cancellation or reduction of European debts.—Page 691.

Men like to work in a plant with modern equipment. Not only is their work lightened by up-to-date machinery, but their pride in the company and their satisfaction with their jobs is heightened.—Page 698.

Screw-downs on new continuous strip mill may be operated individually or together. Each screw is driven by an independent motor, giving almost instantaneous adjustment of the rolls.—Page 694.

Material moves one-eighth mile in a straight line. But so quickly is the slab transformed into coils of finished strip steel in the new Trumbull mill that no re-heating is necessary.—Page 693.

Will American steel makers suffer in sharper competition for export business? "Present indications are that foreign competition is increasing and that our steel makers can hold their place in world markets only with considerable effort, and probably at price concessions, during the near future," says Dr. Haney.—Page 728.

Building continues at a high rate. August contracts, figured in floor space, showed almost exactly the usual seasonal gain of about 7 per cent. Structural steel bookings for July were exceptionally high.—Page 728.

French business of many American manufacturers will be wiped out by new tariff. The duties on many classes of American-made machinery, hardware, instruments, etc., are 4.1 times those assessed on German and English manufacturers. Sales to France in lines affected aggregate about $10,000,000 a year. Our State Department will protest that new rates are discriminatory.—Page 739.

Is hand-to-mouth buying being carried to uneconomical extremes? Steel mills find that cost of handling small orders is high, giving rise to the thought of charging more for small lots. But the suggestion is made that instead of adding extras, it would be far better to set the base price on the minimum quantity and to give "discounts" for quantity purchases.—Page 737.

Cost of unemployment insurance will be divided equally between employer and employee. The State bears no part of the premium cost in new German compulsory unemployment insurance law. Strikers receive no benefits; nor do persons who have refused any kind of employment offered them within the district.—Page 737.

Has New England been penny-wise and pound foolish in regard to the purchase of new production equipment? The view is expressed that many manufacturers in the "American cradle of industry" have been uneconomically thrifty and that their future depends upon modernizing their production equipment.—Page 698.

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Hold the Naval Jingoes Till 1931

SPACE is gladly given in this issue to a summary of the recent conference on naval limitation at Geneva. Were justification required, it could be given on three counts: first, that steel and machinery "interests" are reputed to profit largely from armament programs; second, that men in industry should know well the facts in a matter of such large import to every citizen; and lastly, that public attention to the break-down of negotiations was deflected by President Coolidge's third term announcement.

During the Geneva conference much lip service was done to the statesmanlike aims the President had in view when issuing his invitation; namely, to bring about international understanding, to maintain national security, to promote peace and good will among nations, and to reduce the burden of taxation. But unfortunately the negotiations were dominated from the first by the admirals, who could hardly be blamed for being naval officers first and diplomats second.

The result was that these larger aims most desired by the people of all countries were wholly lost sight of in the sailor's desire to emerge with a decision favorable to the particular kind of fleet his naval staff most desired. And what any naval staff wants least is limitation. They all want ships and many of them. Bridgeman wanted plenty of light cruisers, Jones plenty of big ones, and Saito plenty of submarines.

It must also be admitted that, while the American delegation led in its protestations that war with England was unthinkable, yet it was readiest to prove how fast we could build 10,000-ton cruisers, how easily we could pay for them, how a cruiser was not worthy of the name unless it mounted 8-in. guns, how Great Britain could convert an enormous fleet of merchantmen into war vessels over night, and how we must protect our foreign commerce with a fleet second to none. If published reports be accurate, Rear Admiral Hilary P. Jones, our chief naval advisor, has the following appalling fleet in view by 1932:

18	battleships
5	airplane carriers
60	cruisers
275	destroyers
15	flotilla leaders
110	submarines

This program would involve laying down 10 cruisers yearly for the next four years and a greater number of cruising submarines. Let it be said immediately that Admiral Jones is likely to get his fleet by the time the solid South votes Republican.

War with England is impossible. War with Japan is remotely improbable. What, then, are all these ships for? Granted that a certain number of cruisers, destroyers and submarines will make a rounded out fleet of the 18 battleships permitted by the Washington treaty, and that other ships (including submarines) of quite limited cruising range are useful for coast defense. What other need is there? None, except to police commerce lanes. This has been England's task for centuries, and she proposes to continue on the job; hence her desire for some 60 small cruisers (as compared with her 114 before the World War), armed with 6-in. guns or less.

While it is too much to agree that a 6000-ton cruiser mounting 6-in. guns is a "non-aggressive" vessel, American public opinion will refuse to see a threat in 60 of them flying the Union Jack, whether we have ships to match them or not. The statement cabled from Geneva that we need 22 10,000-ton cruisers to convoy troop ships to the Far East is pure jingo, for the greatest calamity that could befall this country would be to embark troops for those ports.

No more worthy of acceptance is the advice given President Coolidge by Representative Timberlake, from a mountaineering constituency in Colorado, that the United States "must have a navy second to none." For parading up the Platte River, so that residents of Denver could feel proud?

We all know what saber-rattling did to Kaiser Wilhelm. To protect essential imports? It would require only a fraction of the money to store ample supplies for any emergency. To keep armor plants and shipyards busy? Better tear them down than build up suspicion in England or Japan.

The ray of sunlight in the present situation is that comment in each country seems to blame its own representatives most for the failure of the conference. We may be sure that if these views persist no fresh naval competition is in sight. In fact, the Japanese and British budgets are both cracking under the strain of their present naval establishments. If American big navy men can be bottled up for the next three years, the whole question can be reopened in an auspicious atmosphere when the Washington conference reconvenes. And may it be under control of statesmen.

"For the rest, Anglo-American friendship *must* be maintained."

High Cost of Small Lot Selling

THE sharper trend toward small-lot buying and selling in steel products has been much commented upon, but as Mark Twain remarked in connection with talk about the weather, nobody does anything about it. In THE IRON AGE of May 26 one phase of the matter was discussed in an editorial with the title, "Who Saves by Inventory Reduction?" The issue of June 9 made further comment under the heading, "Service Eating Up Profits."

Lately, and rather tardily, some of the mills have been disposed to study the addition to cost made by small orders. The only advantage to the mills, as sellers, is that small-lot business offers less temptation to price cutting, as was pointed out in this department of THE IRON AGE on April 28 last, but that is rather cold comfort.

That the mills would like to have in operation a system whereby regular rules would make price differentials according to the size of specification involved is beyond doubt. The practical question is whether any such system could be established. Perhaps the change would not be so difficult as is loosely assumed. The first thing to be considered is human nature. It makes a great difference whether the buyer is asked to pay extra for a small-lot delivery or is offered a discount for a large-lot delivery. The suggestion, therefore, would be to make a base price on small lots, with discounts for larger quantities, rather than a base price on large lots with premiums for smaller lots. Some months ago the cold rolled strip makers set up this principle in marketing and the effort is reported to be a success.

It will be understood that the argument for a quantity differential is not so much with respect to the size of the individual order as it is with regard to the quantity taken at one time of a given size or description of material. It is the material put through the mill that counts rather than the paper order.

In making the suggested change good-will on the part of the buyer would have to be created. Apparently the buyer has been bent upon committing himself on smaller and smaller tonnages as time passed, and it is assumed that he has sound reason for his preference. Perhaps not. It has been a common experience for a mill to receive an order one day and next day be visited by the buyer's representative, intent upon rushing the shipment. That costs the buyer money. Undoubtedly buyers have saved a great deal by not carrying the large stocks that used to be in vogue. But many a vice is a virtue carried to excess, and it may be the buyer would find on investigation that he had gone too far, so far that he is adding to his expense by extreme small-lot buying, that the stage of saving by the practice has been left far behind. Some of the effort now devoted to effecting sales might well be diverted to encouraging the buyer to study this matter from his own side.

German Unemployment Insurance

GERMANY'S new compulsory unemployment insurance law, which will go into effect Oct. 1, has as a fundamental proviso that "unemployment pay shall be drawn only by persons capable of work, willing to work and involuntarily unemployed," and none shall be considered involuntarily unemployed who refuses work of any kind in any district of the republic. If this principle is lived up to, the malingerer and chronic loafer, who welcome idleness so long as it brings with it some remuneration—which they often have been able to get under the British unemployment insurance law—will find poor pickings. Nor may persons without work as the result of strikes and lockouts be considered as unemployed, excepting in cases where distress results from a strike in another industry than their own, to which they are not a party.

The State is excluded as a contributor to insurance premiums, which must be paid share and share alike by employers and employees. Thus the taxpayer is not called upon directly to support idle workers. The total premium shall not exceed 3 per cent of wages, but the premium is to be held at this maximum figure until such time as a reserve has been collected sufficient to provide unemployment insurance for 600,000 unemployed persons at one time.

Unemployment pay varies in per cent of wages earned. Dependent upon which of eleven wage groups includes the insured, the per cent increasing as wage dwindles. Where the wage is around 60 marks a week the wage received by an unemployed person is set at 35 per cent if he has no dependents, and an additional 5 per cent for each dependent not exceeding four. If it turns out that the German system works better than others of the same purpose it will be because of the elimination of the unworthy worker from its benefits.

New Problems of the Highway

EVERYONE knows of the interest Mr. Ford takes in maintaining examples of colonial life in New England, as evinced by his acquisition of the Wayside Inn, etc. The Wayside Inn stands closely alongside of the main highway from Boston to Springfield and thence to New York and Albany, and over it passes one of the densest automobile traffics in the land. It appeared that the trucks jarred the foundations of the Wayside Inn, wherefore Mr. Ford with the sanction of the State of

Massachusetts is diverting the road, and himself building a new stretch of a mile and a half at an estimated cost of $280,000. Mr. Ford is fortunately able to do such things, but many other persons whose foundations are being shaken cannot help themselves.

This is a matter in connection with automobile transportation over the highways that has not yet come into general consideration. The public is convenienced by such transportation. There may be also economies for that part of the public which enjoys it directly; but whether there be real and general economy is not so certain. No doubt the railroad companies could offer much cheaper transportation if they were favored with roadbeds and rails constructed, laid and maintained at the expense of the public.

Granting that the public enjoys conveniences and in part economies by virtue of automobile transportation over the highways, it is questionable if such enjoyment be economically legitimate, and to what extent individual interest should be sacrificed, or it might be said robbed. Many taxpayers in country towns are required to maintain their gravel roads, with only a modicum of aid from the State, and see them rapidly worn out by the regular passage of 5-ton and 10-ton trucks, carrying brick and stone in the interest of persons in other towns, although such roads were never designed for such heavy traffic.

Some of these admitted evils may be corrected by limitation of freight traffic according to road types. There may be also a more general assumption by the State of road construction and maintenance, a much heavier taxation upon the trucks to provide the funds for these purposes, and a more comprehensive and severe policing. Policies and legislation of such nature may be instituted, although as yet there has been but little headway in this direction. However, none of these things is going to help the person whose house is shaken by the passage of heavy trucks over the highway on which it fronts.

The World Using More Steel

EXPORTS of steel from the countries which lead in its production indicate that both they and the non-producing countries have accelerated the pace of their recovery from the war. Not until 1926 did the total exports of the six principal steel exporting nations exceed those of 1913. This year the volume has expanded notably, as appears from the following data, the latest available, which are given in thousands of gross tons per month:

Iron and Steel Exports—Monthly Average in Thousands of Gross Tons

	To April 1, 1927	All of 1926
Great Britain	274.7	249.0
United States	175.2	171.9
France	472.2	343.8
Belgium and Luxemburg	375.1	308.9
Germany	401.8	402.0
Total	1,699.0	1,475.6

This year's average at 1,699,000 tons per month exceeds that of last year by 223,400 tons, or 15 per cent. The figures are compiled by the National Federation of Iron and Steel Manufacturers of Great Britain. The point may be made that the increase in Great Britain is only a natural rebound from the strike conditions of last year. That is true. But such recovery, if it represented only the retaking of trade which went elsewhere last year, might have been accompanied by reduced exports by other countries. The significant fact is that the steel exports of the six countries which lead in production were 670,000 tons more in the first three months of this year than in the opening quarter of 1926.

FOUNDRYMEN PREPARE FOR 1928

Convention and Exposition at Philadelphia in May to Honor Charter Members

FOUNDRYMEN are looking forward to the annual convention and exposition of the American Foundrymen's Association to be held at Philadelphia, the week of May 14, 1928. This will be the first gathering of this nature to be held along the Atlantic seaboard since 1919 and the fourth one in Philadelphia. The first one was held in 1896, the second in 1907 and the third in 1919. The invitation to Philadelphia is sponsored by the Philadelphia Foundrymen's Association and the Philadelphia Chamber of Commerce.

To Honor Charter Members

A feature of the convention program will be the honoring of the founders of the A. F. A. A special effort will be made to secure the attendance of all those now living who were charter members and attended the organization meeting. The present president and the secretary of the Philadelphia Foundrymen's Association, Walter Wood and Howard Evans, not only were charter members of the A. F. A. but both signed the call for the organization meeting and special honor will be accorded them on this occasion. They both have been very active in their efforts to secure the 1928 convention for their city. Philadelphia is the fifth city in the Union in point of total number of foundries, and in Pennsylvania and the adjoining States are located more than 40 per cent of the foundries in this country.

Papers for the Convention

The chairman of the paper and program committee for the convention requests all those who wish to present papers at the next meeting to write to the secretary of the papers committee giving information as to subjects to be covered. As the number of papers at each session will be limited and as time is needed for their review by the committee, manuscripts should be in not later than March 1, 1928.

Attention is called to the action of the board of awards in setting aside three $100 cash prizes to be awarded to the three best papers which will be submitted. The subjects to be covered in papers eligible for prizes are:

Non-ferrous Foundry Metals, Malleable Cast Iron, Steel Castings, Gray Iron and General Foundry Practice.

Only one paper in any one group may be given a prize.

International Congress in 1929

The Third International Congress will be held in London, England, May 28 to June 1, 1929. An official invitation from the Institute of British Foundrymen to the A. F. A. to participate in this congress was presented to the board of directors and unanimously accepted.

French Tariff Called Discriminatory

American Exporters Have to Pay 4.1 Times As High Duties As Those Assessed on German and English Shippers

WASHINGTON, Sept. 13.—The new French tariff, effective Sept. 6, has aroused grave concern on the part of the American Government and the many industries of this country affected by the great increases in duties applying to them. Official notice has been taken by the American Government of the action of the French Administration, and Secretary of State Kellogg has said that he views the duties as discriminatory against this country. The Department of Commerce predicts the probability of reduced trade between the United States and France on a wide range of American commodities, because the new French tariff, established in connection with the new Franco-German treaty imposes on certain lines of American goods duties four times as high as those applying to competing products from Germany, England and other countries.

Among American lines affected are heavy machinery, steel sheets and hardware. It is estimated, however, that approximately 90 per cent of American exports to France are goods either free of duty or subject to the minimum rates. On the United States will fall the new general rates, which are 4.1 times the minimum rates applicable to Germany and other favored nations, on the following, along with other, lines:

> Electrical equipment: Dynamo-electric machines; electro-technical apparatus; dynamo armatures and parts; insulated wires and cables; electric storage batteries; dry batteries.
>
> Heavy machinery: Textile machinery; printing machinery and accessories; hydraulic engines and pumps; steam engines and boilers; machines and apparatus not specified; heating and refrigerating apparatus; flywheels; certain parts of machines.
>
> Light machinery and instruments: Sewing machines, scientific instruments and apparatus; precision instruments; optical instruments; phonographic supplies; surgical instruments; certain musical instruments.
>
> Hardware and other metal products: Cutlery other than fine; needles; buckles, clasps, etc.; keys, bolts, hinges, etc.; chains, screws; rivets, bolts and nuts; certain copper manufactures; aluminum articles; asbestos manufactures; mica sheets and wares.

On a substantial number of important products, however, the United States will continue to receive minimum rates of duty. Among them are the following:

> Machine tools, hand tools, abrasives, locks and padlocks, agricultural machinery, tractors, engines and motors, equipment for iron and steel mills, boilers and radiators, bottling machinery, certain machine parts, typewriters, calculating machines, measuring instruments, kitchen appliances, household articles of iron and steel, copper, pure or alloyed, raw and semi-processed.

Among classes of products on which the United States will continue to receive either the former intermediate rate or the new minimum rate, whichever is higher, are vehicles other than automotive and railroad, milling machinery, certain fine cutlery, toys and parts.

Examples of Some of the Changed Rates

The steel sheets which will be given rates 4.1 times the minimum rate to be accorded Germany and other countries are those containing more than 0.50 per cent silicon. The old rates on uncut sheets ranged from 40.50 to 67.65 fr. per 100 kilos (0.73c. to 1.23c. a lb., figured at 4c. a franc), while the new rate is 225.5 fr. per 100 kilos (4.09c. a lb.). On these sheets, when cut, the old rates applying to the United States ranged from 45.125 to 73.8 fr. (0.82c. to 1.34c.), while the new rate is 258.3 fr. (4.69c. a lb.) On the same sheets when insulated by paper, card or cardboard the rates previously applied were the same as those on the plain sheets, cut or uncut, while the new rate is 278.8 fr. (5.06c.) The new rates on these sheets with insulated coating is 15 per cent ad valorem.

The new rates on heavy machinery are indicated by those applying on hydraulic equipment. On pumps, the new rates range from 328 to 574 fr. per 100 kilos, (5.95c. to 10.41c. a lb.), according to weight, as against minimum rates ranging from 80 to 140 fr. (1.45c. to 2.54c.) for Germany and other favored nations. The old rates applying to the United States ranged from 135 to 270 fr. (2.45c. to 4.90c.) On hydraulic machines the new rates for the United States range from 389.5 to 943 fr. (7.07c. to 17.11c.), against minimum rates of 95 to 230 fr. (1.72c. to 4.17c.) The old rates on these machines for the United States ranged from 135 to 270 fr. (2.45c. to 4.90c.)

Attempts to Obtain Fair Treatment

Strong efforts are being made through the State Department to have France moderate the tariffs as they apply to the United States and to get favored-nation treatment. It has been pointed out that while in a large number of lines where higher rates apply the trade with France has not been heavy, at the same time such trade was being built up with prospects of large business. This will become utterly impossible if the high tariff barriers are not reduced. Representations made to France by the American Government suggest the suspension of higher duties on American than on German or other goods, pending the negotiation of a commercial treaty between the United States and France.

American shipments to France in the lines now subject to the four-fold duties have amounted to well over $10,000,000 a year. The Department of Commerce statement said that the changes in the German duties incidental to the Franco-German treaty do not seem unfavorable to the United States trade, "and might in fact improve somewhat the position of certain American goods in the German market."

How Germany Is Affected Under the Treaty

By the terms of the treaty, Germany grants France the benefit of the conventional duties of the German tariff which are those hitherto paid by the United States and other countries enjoying favored-nation treatment in Germany, and, in addition, establishes reductions from the present rates on a list of commodities of particular interest to France. While the favored-nation treaty between the United States and Germany assures American goods of the benefit of the new reduced duties, the majority of the new German duties concern characteristic products of France and Alsace-Lorraine. The principal commodities of interest to American trade now subject to reduced duties in Germany are automobile engines and assembly parts, wheat flour, patent medicines and varnishes.

Concessions granted to German goods entering France, by the terms of the treaty, have a more important bearing on American trade. On most of the commodities of which she is an important producer, Germany either receives favored-nation treatment, on the basis of the existing rates, or is accorded the new minimum duties established by the partial revision of the French tariff which went into operation simultaneously with the treaty and affecting 400 items. Before the War Germany enjoyed most-favored-nation treatment in the French market, a circumstance which, joined with her nearness to the French consumers, and especially her nearness to the northern industrial section of France, gave Germany distinct advantages as compared with other countries. Since the War Germany has paid higher rates of duty on most of her exports to France than had been levied on similar goods from other countries.

Iron and Steel Markets

Market Remains at Summer Level

Large Rail Buying Imminent—Indications that Production of Steel in 1927 Will Exceed 1925—Prices Still Ragged—Lower Basic Pig Iron

SOME large rail orders now imminent and increased activity among agricultural implement manufacturers are chief factors which promise to lift the steel industry above the July-August level of production. Demand through the first half of September has remained at the low pace of the summer, but mill operations in the past week have receded slightly, with the Steel Corporation at a 67 per cent rate.

The August output of steel ingots represented close to a 72 per cent scale of operations, or a trifle more than in July, and comparing with 85 per cent for August, a year ago. The eight months, however, averaging 81½ per cent of capacity, gave a total of nearly 30,500,000 tons, or only 4 per cent under the corresponding period of 1926. With no more than the August production rate continued over the remainder of the year, the 1927 output would be equal to that of 1925, which until 1926 broke it was the high record.

What has been outstanding for many weeks is a general assumption that the market is waiting largely on the disclosures of the program of one company, the Ford Motor Co.; yet this may be months short of completion.

For June, July and August the country's production of automobiles and trucks has been barely 75 per cent of the output for the same months of 1926. This means a loss of probably 3½ per cent of the total steel output, or, counted in ingots, of 135,000 tons per month.

Further, with the reminder that railroad car orders in July and August amounted to 2000, while in the first six months 36,000 were bought, the evidence is that buildings and construction and numerous smaller avenues of steel consumption account for the large tonnage so far this year.

Prices, in spite of the continuing large volume of business, average $1.50 a ton below those of a year ago and in the past week or two have shown signs of instability. In the face of this, producers claim conditions are ripe for a stiffening, on the score there will shortly be diminishing concern over securing bookings each week sufficient to sustain operations.

The price irregularities have extended to blue annealed sheets in competition with narrow and moderately wide strips, with shading of $1 and $2 a ton, but it still remains that, lacking tonnage business, there is little incentive to cut. Unsettlement for the time being has been aggravated by the holding up of steel shipments by a maker of low priced automobiles. In the South, where mounting business might well be expected, efforts of Northern and Southern mills to secure galvanized sheet orders resulted in cuts of $2 to $4 a ton.

For lap welded pipe, inquiries have appeared for three lines requiring 110,000 tons of large casing. Meanwhile the lap weld mills at Lorain have shut down for lack of orders and seamless pipe mills are operating below a 50 per cent rate of capacity.

The leading producer of tin plate has booked a fair amount of anticipatory 1928 business and will start in October on these orders and on a good size fourth-quarter contract.

In pig iron there has been another decline in prices, this time in the Valleys, where 6000 tons of basic iron was bought at $17, furnace, a reduction of 25c. a ton, bringing the market on that grade to the lowest level since 1915. There is weakness in the Chicago district, but at Detroit and Buffalo some furnaces have advanced quotations 50c. to $1 a ton, following the accumulation of fair backlogs. Demand has subsided throughout the country, and at Cleveland, which has been one of the most active markets, little buying is looked for until consumers cover for the first quarter of 1928.

Scrap is without definite trend and lacks the buoyancy of a few weeks ago. Expectations of an increasing demand from consumers for fall consumption have failed to materialize. At Detroit, a leading scrap producing center, various grades have declined 25c. to 50c. a ton.

Structural steel orders of 30,000 tons include 4800 tons for a Newark, N. J., viaduct and 2500 tons for a gas holder at Hopewell, Va. A viaduct in Cincinnati, now up for bids, will take 2500 tons of reinforcing bars.

Current prices of rivets have been extended to cover fourth quarter buying.

Wire rods have sold at $42 at Cleveland, a concession of $1 a ton.

Gravel fluorspar, on a sale of 1000 tons, has declined 50c. a ton to $16, mines.

Reaching the lowest figure since the fall of 1916, THE IRON AGE composite price for pig iron has dropped to $18 a ton, from $18.04 last week. It thus falls below the previous post-war low of $18.02, established in February, 1922. It has dropped $1.71 since the opening of the year. THE IRON AGE composite price for finished steel remains unchanged at 2.367c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Sept. 13, 1927	Sept. 6, 1927	Aug. 16, 1927	Sept. 14, 1926
No. 2 fdy., Philadelphia	$20.26	$20.26	$20.76	$21.76
No. 2, Valley furnace	17.50	17.50	17.50	17.50
No. 2, Southern, Cin'ti	20.94	20.94	20.94	24.19
No. 2, Birmingham	17.25	17.25	17.25	21.00
No. 2 foundry, Chicago*	19.50	19.50	19.50	21.00
Basic, del'd eastern Pa	20.00	20.00	20.00	20.75
Basic, Valley furnace	*17.00*	17.25	17.25	17.50
Valley Bessemer, del. P'gh	19.76	19.76	20.26	19.76
Malleable, Chicago*	19.50	19.50	19.50	21.00
Malleable, Valley	17.50	17.50	17.50	17.50
Gray forge, Pittsburgh	18.76	18.76	18.76	18.76
L. S. charcoal, Chicago	27.04	27.04	27.04	29.04
Ferromanganese, furnace	90.00	90.00	90.00	88.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	33.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	35.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	35.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	36.00
Forging billets, P'gh	39.00	39.00	39.00	40.00
O.-h. billets, Phila	38.30	38.30	38.30	40.30
Wire rods, Pittsburgh	43.00	43.00	43.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.90

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.22
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.80	1.80	1.80	2.00
Steel bars, Chicago	1.90	1.90	2.00	2.10
Steel bars, New York	2.14	2.14	2.14	2.34
Tank plates, Pittsburgh	1.80	1.80	1.80	1.90
Tank plates, Chicago	1.90	1.90	2.00	2.10
Tank plates, New York	*2.04*	2.09	2.09	2.24
Beams, Pittsburgh	1.80	1.80	1.80	2.00
Beams, Chicago	1.90	1.90	1.90	2.10
Beams, New York	1.95	1.95	1.95	2.34
Steel hoops, Pittsburgh	2.30	2.30	2.30	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire.	Sept. 13, 1927	Sept. 6, 1927	Aug. 16, 1927	Sept. 14, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	3.00	3.00	3.00	3.00
Sheets, black, No. 24, Chicago dist. mill	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, P'gh	3.85	3.85	3.85	3.85
Sheets, galv., No. 24, Chicago dist. mill	3.95	3.95	3.95	3.95
Sheets, blue, 9 & 10, P'gh	2.25	2.25	2.25	2.30
Sheets, blue, 9 & 10, Chicago dist. mill	2.35	2.35	2.35	2.40
Wire nails, Pittsburgh	2.55	2.55	2.55	2.65
Wire nails, Chicago dist. mill	2.60	2.60	2.60	2.70
Plain wire, Pittsburgh	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh	3.25	3.25	3.25	3.35
Barbed wire, galv., Chicago dist. mill	3.30	3.30	3.30	3.40
Tin plate, 100 lb. Box, P'gh	$5.50	$5.50	$5.50	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$15.50	$15.50	$15.50	$18.00
Heavy melting steel, Phila	14.00	14.00	14.00	17.00
Heavy melting steel, Ch'go	12.25	12.25	12.50	14.25
Carwheels, Chicago	14.50	14.50	14.50	15.25
Carwheels, Philadelphia	15.50	15.50	15.50	17.50
No. 1 cast, Pittsburgh	15.00	15.00	15.00	16.50
No. 1 cast, Philadelphia	**16.50**	16.00	16.00	18.00
No. 1 cast, Ch'go (net ton)	*14.50*	14.75	14.75	17.00
No. 1 RR. wrot. Phila	15.50	15.50	15.50	17.50
No. 1 RR. wrot. Ch'go (net)	*11.25*	11.50	11.50	13.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.85	$2.85	$3.00	$3.25
Foundry coke, prompt	4.00	4.00	4.00	4.25

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.25	13.25	13.50	14.50
Electrolytic copper, refinery	13.00	13.00	13.00	14.07½
Zinc, St. Louis	*6.25*	6.27½	6.37½	7.47½
Zinc, New York	*6.60*	6.62½	6.72½	7.82½
Lead, St. Louis	*6.00*	6.05	6.40	8.50
Lead, New York	*6.25*	6.40	6.75	8.75
Tin (Straits), New York	*62.00*	63.75	64.37½	68.87½
Antimony (Asiatic), N. Y.	*11.50*	11.75	12.00	16.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Improvement Lacking in Steel Mart—Basic Pig Iron Declines

PITTSBURGH, Sept. 13.—The first half of September has brought no substantial betterment in the demand for finished steel, and, as is usually true when hopes long held fail to materialize, confidence in the future is shaken. Cheerful utterances lately made appear to have been based more on hope than upon tangible possibilities, and even the increase reported by the Steel Corporation in its unfilled orders as of Aug. 31, has failed to check the apprehension that the final quarter of the year will be below early expectations. It is commonly said that the gain in unfilled orders was chiefly the result of the fact that August was a light shipping month for the corporation, aided by some advance 1928 tin plate orders.

While a few of the automobile companies which have been doing a little better than others are in the market for steel, the general demand from that industry still leaves much to be desired. Incidentally, the presence of these few car builders in the market is an occasion for nervousness on the part of makers of some kinds of steel used in car manufacture, for the reason that the prices now quoted are above what ruled on much of the tonnage that has moved in the past five months.

Demand for pipe from the oil industry is dropping off, rather than increasing, and paucity of railroad buying still is commented upon. Structural steel demand, which has been one of the bulwarks of the market so far this year, is not expected to hold up in the last quarter of the year, when weather conditions usually impose some restrictions upon building work. The bright spot is in the agricultural outlook, as smaller crops generally have resulted in higher prices and the farming population should have greater buying power than last year. The agricultural implement industry has had a good year and is looking forward to another good one, although current demands from that quarter are not now notable for size.

Steel prices in the main are holding, but there is some raggedness. This is seen in narrow hot-rolled flats, in which manufacturers of bars have taken some business away from recognized producers by underquoting them by $1 to $2 a ton. Some irregularity also is noted in black sheets, but concessions on a large tonnage recently on the market are explained locally by the fact that the material was for barrels, which would involve the use of tin mill black plate for tops and bottoms. The common practice is to quote an average price for both grades, in which case the lower base price on tin mill black plate would be likely to offset the higher base on black sheets. Prices on cold-finished steel bars also vary. It must be said, however, that the weakness in other markets on plates, shapes and bars has not seriously disturbed the local market.

As measured by ingot production, the activity of the steel industry is as high as it was last week, although there has been some lessening in the pace of the corporation's Youngstown district plants. The Carnegie Steel Co. blew out its No. 1 Ohio furnace at Youngstown today, and one of its Clairton stacks was

blown out last week, leaving only 22 active out of a total of 51 stacks. In a general way, ingot output at around 65 per cent is somewhat ahead of finishing mill engagements.

A decline of 25c. per ton in Valley basic iron to $17 on fair-sized sales stands out in an otherwise dull and uninteresting pig iron market. Incidentally it is the lowest price reached since late in 1915. There is little real strength to the scrap market, since consumptive demand is slack in keeping with steel works operations. The coke market is easy when producers would like to see it otherwise for its bearing on fourth quarter contract prices, and the coal market is affected adversely by the possibility that there will be a settlement between operators and union minors in Illinois, which would cut off some prospective demands upon nonunion mines.

Pig Iron.—Sales of basic iron aggregating approximately 6000 tons have been made at $17, Valley furnace, the purchaser being a steel company that is believed to be preparing to shut down its own productive capacity. The iron is being supplied by steel companies that have lately been making more iron than has been necessary to meet their own requirements. Except for these sales, the market has been extremely dull so far as new business has been concerned, and if there has been any increase in the melt, it has been taken care of by shipments on older orders. Producers are holding firmly on foundry and malleable iron, and there are no suggestions that sales of Bessemer iron have been made at less than the recent prices. A sale of 1000 tons of iron having an analysis between Bessemer and malleable is noted at $18, Valley furnace. The furnace of the Shenango Furnace Co., Sharpsville, Pa., which was banked before Labor Day, has resumed, but the blowing out of the two Carnegie furnaces leaves only 60 of the 125 furnaces in this and nearby districts in production. The numerical basis is probably misleading as to actual production, as most of the furnaces active are of large unit production capacity.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	18.00
Gray forge	17.00
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	17.50
Low phosphorus, copper free	27.50

Freight rate to the Pittsburgh or Cleveland districts, $1.76.

Ferroalloys.—The steel industry is not increasing production and is pursuing a hand-to-mouth policy in its purchases of raw materials. Specifications on contracts are for the minimum quotas, and producers can very easily supply the spot tonnages that are wanted from unspecified production. The dullness is purely a matter of requirements, and producers are not disposed to shade prices in the hope of creating business.

Semi-Finished Steel.—No improvement can yet be chronicled in the demand for billets, slabs and sheet bars, and none seems likely until the motor car industry reaches a higher stage of activity. That industry ordinarily consumes about one-third of the country's sheet production, and since its present takings are materially under that rate, other consumers feel quite safe in purchasing supplies as they are needed. This makes for a low rate of sheet mill engagement and, consequently, for a light demand for unfinished steel. Tin mill operations also are low. Strip steel makers are not overburdened with business, and their requirements in billets and slabs are light. Prices are holding, since makers are matching light demand with light production. Skelp for buttwelded pipe is moving rather steadily in keeping with a fairly active market in that kind of pipe. Wire rods have often been more active than they are at present.

Rails and Track Supplies.—The market is inactive. The railroads have yet to make inquiry for their fourth quarter requirements of track accessories, to say nothing of the standard-section rails and accessories for next year. Makers' order books are slim, but there is no tendency to build them up at the expense of prices.

Wire Products.—The market still lacks activity but is making a good showing as to prices, which are well maintained in this market and appear to be holding in other producing districts. The demand, however, is not large enough to provide a real test, since jobbers and manufacturing consumers are still drawing against contracts written at lower prices than those now quoted and fourth quarter contracts have not yet come under consideration.

Tubular Goods.—Seasonally good demand still is noted for buttwelded pipe, which always is wanted in connection with heating requirements and the completion of building projects during September and October. But lapwelded and seamless pipe still feel the depression in the oil industry. All of the lapwelding furnaces at the Lorain, Ohio, works of the National Tube Co. are down this week, and other producers are having the lowest operation in a long time in furnaces of that type. Seamless pipe mill operations are below 50 per cent of capacity, since there is so little deep well drilling, for which seamless pipe is more dependable than welded pipe. The Gulf Oil Co. is reported to have revived an inquiry for a large tonnage of 22-in. line pipe, and the Moody-Seagrave line, to run from Monroe, La., to Port Arthur, Tex., is said to have been financed. The latter line, calling for 200 miles of 22-in. pipe, some time ago was tentatively placed with a Milwaukee maker. Lack of railroad and automobile buying tells on the demand for boiler tubes and tubing.

Tin Plate.—The absence of frosts is helping the late crops and is causing some extra demand for tin plate, but as a rule the supplementary purchases are for small lots and the general picture of the market is still one of dullness. The leading producer has had a fair amount of anticipatory 1928 business, against which shipments will start in October, and its bookings also have been swelled by one good-sized fourth quarter tonnage. This business was a factor in the increase in the unfilled tonnage statement of the Steel Corporation for August. Tin plate mill engagement ranges from 65 to 70 per cent. Because of short packs of the leading fruits and vegetables this year, the common expectation is that next year will make a good showing in tin plate.

Bars, Plates and Shapes.—In this district the price of 1.80c., base Pittsburgh, is well observed on the gen-

The Iron Age Composite Prices

Finished Steel

Sept. 13, 1927, 2.367c. a Lb.

One week ago	2.367c.
One month ago	2.367c.
One year ago	2.439c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4:	2.339c.,	Apr. 26
1926	2.453c.,	Jan. 5:	2.403c.,	May 18
1925	2.560c.,	Jan. 6:	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15:	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24:	2.446c.,	Jan. 2

Pig Iron

Sept. 13, 1927, $18.00 a Gross Ton

One week ago	$18.04
One month ago	18.13
One year ago	19.46
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	$19.71,	Jan. 4:	$18.00,	Sept. 13
1926	21.54,	Jan. 5:	19.46,	July 13
1925	22.50,	Jan. 13:	18.96,	July 7
1924	22.88,	Feb. 26:	19.21,	Nov. 3
1923	30.86,	Mar. 20:	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	1.80c.
F.o.b. Chicago	1.90c.
Del'd Philadelphia	2.12c.
Del'd New York	2.14c.
Del'd Cleveland	1.99c.
F.o.b. Cleveland	1.80c.
F.o.b. Birmingham	1.95c. to 2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.80c. to 1.90c.
F.o.b. Birmingham	1.95c. to 2.05c.

Rail Steel

F.o.b. mill	1.65c. to 1.80c.
F.o.b. Chicago	1.90c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.75c. to 1.80c.
F.o.b. Chicago	1.90c.
F.o.b. Birmingham	1.90c. to 2.00c.
Del. Cleveland	1.99c.
Del'd Philadelphia	2.02c. to 2.12c.
Del'd New York	2.04c. to 2.14c.
C.i.f. Pacific ports	2.30c. to 2.40c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.75c. to 1.80c.
F.o.b. Chicago	1.90c.
F.o.b. Birmingham	1.90c. to 2.00c.
Del'd Cleveland	1.99c.
Del'd Philadelphia	1.90c. to 2.02c.
Del'd New York	1.90c. to 2.04c.
C.i.f. Pacific ports	2.35c. to 2.40c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh	2.30c.
All gages, 6 in. to 12 in., P'gh	*2.10c.
Nos. 13 and 14 gage, 12 in. to 14 in., P'gh, net	2.30c.
Nos. 15 and 16 gage, 12 in. to 14 in., P'gh, net	2.40c.
All gages, narrower than 6 in., Chicago,	2.40c. to 2.60c.
All gages, 6 in. and wider, Chicago,	2.20c. to 2.50c.
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Atlantic ports	$1.21
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Gulf ports	$1.20

*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c. to 2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.30c. to 2.35c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., f.o.b. P'gh mill	3.25c.
Strips, under 12 in., f.o.b. Cleveland mills	3.25c.
Strips, under 12 in., delivered Chicago	3.55c.
Strips, under 12 in., f.o.b. Worcester mill	3.40c.
Stripsheets, 12 in. and wider, Pittsburgh mill	3.00c.
Stripsheets, 12 in. and wider, Cleveland mill	3.00c.
Stripsheets, 12 in. and wider, del'd Chicago	3.30c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	3.25
Barbed wire, painted	3.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.25c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.35c.
Nos. 9 and 10, del'd Philadelphia	2.57c.
Nos. 9 and 10, f.o.b. Birmingham	2.40c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	3.00c.
No. 24, f.o.b. Ch'go dist. mill	3.10c.
No. 24, del'd Philadelphia	3.32c.
No. 24, f.o.b. Birmingham	3.15c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	4.15c.
No. 24, f.o.b. Pittsburgh, B grade	3.95c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.85c.
No. 24, f.o.b. Chicago dist. mill	3.95c.
No. 24, del'd Philadelphia	4.17c.
No. 24, f.o.b. Birmingham	4.00c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c. to 3.10c.
No. 28, f.o.b. Chicago dist. mill	3.20c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.25c.

Long Ternes

No. 28, 8-lb. coating, f.o.b. mill	4.20c. to 4.30c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.60

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.40
15-lb. coating I.C.	14.45
20-lb. coating I.C.	15.80
25-lb. coating I.C.	$17.30
30-lb. coating I.C.	18.75
40-lb. coating I.C.	20.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		Base Per 100 Lb.
21.00*	(½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.10 to 4.20
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.10 to 3.20
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.10 to 3.20
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.10 to 4.30
6100	(Chrom. Vanad. spring steel)	3.60 to 3.80
9250	(Silicon Manganese spring steel)	3.00 to 3.15
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.10 to 4.30
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.00 to 4.25
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.10 to 3.20
	Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	$36.00 to 38.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80 to $2.90
Spikes, ½ in. and smaller	2.80 to 3.00
Spikes, boat and barge	3.10
Tie plates, steel	2.35
Angle bars	2.75
*Track bolts, all sizes, per 100 count,	70 per cent off list

*Chicago mill prices on large track bolts are shown in Chicago market report.

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	45	32½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1¾ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3½ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

eral run of business, and on bars that price is also said to be the ruling one, even to large buyers. Bar orders are slightly more numerous, but there is no evidence of a departure from close-to-requirement purchases by buyers. The decline in the operations of the Carnegie Steel Co. in the Youngstown district is largely due to the lack of bar activity. That company, however, is running at better than 40 per cent in that district. Plate business is not active, and incoming business in shapes is not matching completed orders. In these products 1.80c. is purely the small-lot price and prevails largely in the so-called Pittsburgh district. Local fabricating shops booked more than 2700 tons in the past week.

Sheets.—This product still reflects in demand the lack of the usual amount of automobile tonnage. Since motor car builders are using up stocks and building sparingly against new models until they get a clear line on retail sales, and ordinarily the motor car demands absorb about one-third of the total sheet production, other users feel safe in taking supplies in strict accordance with known needs. If anything, they are buying closer to actual needs than they were recently. An increase in automobile industry demands, it is believed, would change the picture. There is pressure against prices, but resistance to it thus far has been strong. An Eastern inquiry for between 1000 and 1500 tons of barrel stock brought out lower than 3c., base Pittsburgh, but tin mill black plate carrying a base price of 3c. for No. 28 gage was involved and the common practice of quoting an average price probably explains the deviation. Mill operations still are around 70 per cent of capacity. Independent companies in August averaged 73 per cent.

Cold-Finished Steel Bars and Shafting.—Orders are a little more frequent, but still lack volume and are no tax upon the capacity of producers. Prices remain uneven. While larger makers are holding to 2.30c., base Pittsburgh, for the general run of orders, small producers are taking business at $2 per ton less.

Hot-Rolled Flats.—Two or three automobile companies are mentioned as likely to be buyers in the next few days. While they are making strong efforts to break the price, they do not appear to have been successful. On narrow material, prices of 2.25c. and 2.20c., base, have been encountered by makers who are holding to 2.30c., but the lower quotations are said to be by bar makers with mills that can produce light flat bars.

Cold-Rolled Strips.—Whether the present prices, which are well above those ruling on much of the second and third quarter tonnages, will be maintained will be demonstrated in the next few days, when several automobile companies are expected to place some fourth quarter business. Quotations that have been made against this business reflect no deviations from 3.25c., base Pittsburgh or Cleveland.

Bolts, Nuts and Rivets.—Makers are opening their books for fourth quarter contracts at the same prices as on third quarter business. On large rivets the contract price remains at $2.75, base, per 100 lb., Pittsburgh or Cleveland, but makers announce that the contracts must be signed and in their hands by Oct. 20, when the price goes automatically to $3. Current business is sporadic, with good orders one day and light ones the next.

Coke and Coal.—Spot offerings of coke are moderate, but more than ample for wants, which are limited by the fact that neither foundries nor blast furnaces are taking any tonnage beyond contract shipments. Producers find it hard to get more than $3 per net ton for spot furnace coke, since some is still available as low as $2.75 that is satisfactory for the purposes to which it is put. Spot foundry is quotable anywhere from $3.75 to $4.75, but the ruling prices are $4 to $4.50. There is a softer tone in the coal market, with no change in the price ranges but with weakness within them. Fairly active demand for domestic coal does not compensate for a slack demand for industrial grades.

Old Material.—The interesting event of the week is that railroad scrap again has sold at higher prices than can be obtained in the open market. The Pennsylvania Railroad realized $15.96 per gross ton for heavy melting steel delivered at Butler, Pa., at another Pittsburgh district point and at Canton, Ohio, while the Baltimore & Ohio steel went at $15.90 to $15.95, delivered at Canton and Portsmouth, Ohio, and Butler, Pa. There is no evidence of direct mill purchases, and since $15.50 is all that can be obtained in this district for heavy melting steel, the premium on railroad steel simply means the existence of some old, high-priced orders at those points. In a general way, the scrap market is quite as dull as it has been at any time lately, and while it is fairly firm on the open-hearth grades, the tendency is downward on the steel foundry grades and just about steady on blast furnace material.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$15.25 to $15.50
Scrap rails	14.50 to 15.00
Compressed sheet steel	14.50 to 15.00
Bundled sheets, sides and ends	13.50 to 14.00
Cast iron carwheels	15.00 to 15.50
Sheet bar crops, ordinary	15.50 to 16.00
Heavy breakable cast	14.00 to 14.50
No. 2 railroad wrought	15.25 to 15.50
Heavy steel axle turnings	14.00 to 14.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.75 to 17.00
Railroad coil and leaf springs	16.75 to 17.00
Rolled steel wheels	16.75 to 17.00
Low phosphorus billet and bloom ends	20.00 to 20.50
Low phosphorus, mill plate	19.50 to 20.00
Low phosphorus, light grade	17.00 to 17.50
Low phosphorus sheet bar crops	19.00 to 19.50
Heavy steel axle turnings	14.00 to 14.50
Electric Furnace Grades:	
Low phosphorus punchings	17.00 to 17.50
Heavy steel axle turnings	14.00 to 14.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.50 to 12.00
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	10.25 to 10.50
Rolling Mill Grades:	
Steel car axles	19.00 to 20.00
No. 1 railroad wrought	12.00 to 12.50
Cupola Grades:	
No. 1 cast	15.00 to 15.50
Rails 3 ft. and under	16.00 to 16.50
Malleable Grades:	
Railroad	15.25 to 15.50
Industrial	14.75 to 15.00
Agricultural	14.25 to 14.50

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c. to 3.65c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.75c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.60c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.30c.
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, ¾ in. and smaller, per 100 count.	62½ per cent off list
Machine bolts, per 100 count.	62½ per cent off list
Carriage bolts, per 100 count.	62½ per cent off list
Nuts, all styles, per 100 count.	62½ per cent off list
Large rivets, base per 100 lb	$3.50
Wire, black soft annealed, base per 100 lb.	2.90
Wire, galvanized soft, base per 100 lb.	2.90
Common wire nails, per keg	$2.80 to 2.90
Cement coated nails, per keg	2.85 to 2.95

The American Rolling Mill Co., Middletown, Ohio, which recently purchased the Columbia Steel Co., with plants at Butler, Pa., and Elyria, Ohio, which make stripsheets, has formally consolidated the district sales offices of the two companies. A part of the sales organization of the Columbia company is being retained

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾-in.	$33.50 to 34.00
Forging, ordinary	39.00 to 40.00
Forging, guaranteed	44.00 to 45.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.80c.
Sheared	1.80c.
Universal	1.80c.

Wire Rods

	Per Gross Ton
*Common soft, base	$43.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is $44. Cleveland mill base, $42 to $43.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.50c.
Iron ore, Swedish, average 66% iron,	9.75c. to 10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	40c. to 41c.
Manganese ore, Brazilian, African or Indian, basis 50%	40c. to 42c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.50 to $10.75
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2 delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.85 to $3.00
Foundry, f.o.b. Connellsville prompt	4.00 to 4.50
Foundry, by-product, Ch'go ovens	9.75
Foundry, by-product, New England, del'd	12.00
Foundry, by-product, Newark or Jersey City, delivered	9.59 to 10.77
Foundry, Birmingham	5.50
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.60 to 1.90
Mine run gas coal, f.o.b. Pa. mines	2.00 to 2.15
Steam slack, f.o.b. W. Pa. mines	1.25 to 1.35
Gas slack, f.o.b. W. Pa. mines	1.40 to 1.60

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$90.00
Foreign, 80%, Atlantic or Gulf port, duty paid	90.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$33.00 to $34.00
Domestic, 16 to 19%	32.00 to 33.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$85.00 to $87.50
75%	145.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	$45 to 46.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$34.00	12%	$38.00
11%	36.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$26.50	10%	$32.00
7%	27.50	11%	34.00
8%	28.50	12%	36.00
9%	30.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c. to $1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.50c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.00 to $16.50
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagon	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled threads up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75 to $3.00
F.o.b. Chicago	2.85 to 3.10

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Output at 60 Per Cent—New Low Prices on Cast Pipe

CHICAGO, Sept. 13.—The Chicago steel market is barely active enough to support mill operations at 60 per cent of ingot capacity. Rail production is low, and track accessory specifications are tending downward. The railroad car market is extremely dull, and car shop operations are approaching the lowest rate of the year. Demand from fabricators for plain material is of moderate proportions, and though the list of pending projects continues to grow, there is little assurance now that there will be any sizable call for tonnage unless promoters make an effort later in the fall to get construction under way before cold weather sets in. A bond house, however, this week announced the underwriting of a 23-story building at Madison and Clark Streets, Chicago.

The bulk of going tonnage in plates, shapes and bars is being placed at 1.90c., Chicago, but the same influences toward weak prices are in evidence that were noted a week ago.

New low prices on cast iron pipe were brought out at Detroit, and pig iron prices in territory surrounding Chicago are softer.

Pig Iron.—Further evidence is at hand of sagging prices in pig iron in the outlying sections of the Chicago district. Sellers are finding it possible to cut the district short on the east by rail shipments from Cleveland. To the west two orders have been taken at $19, base Chicago furnace, the total iron involved being 500 tons. At Milwaukee 100 tons of No. 1 foundry iron was sold at $20.73, which, after deducting the freight from Chicago to Milwaukee and the 50c. silicon differential, figures back to $19.23, base, Chicago furnace. Another $19 sale has been made to the south of Chicago, where the freight advantage to local producers is 77c. In Chicago proper the market is holding at $19.50, furnace, but sales are less numerous than a week ago and prices cannot be said to be strong. Hot weather is cutting foundry production, and shipments are lighter. Sales are confined largely to requirements that are wanted in the next 30 days. There is a moderate amount of activity in silvery, and prices are holding. A user in eastern Michigan has taken 1500 tons, and two 100-ton lots have been purchased by melters near Chicago. The charcoal iron market is dull.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$19.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.00
Malleable, not over 2.25 sil.	19.50
High phosphorus	19.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	23.26
Southern No. 2 (barge and rail)	21.43
Low phos., sil. 1 to 2 per cent, copper free	$31.50 to 32.00
Silvery, sil. 8 per cent	33.29
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Producers have not as yet opened books on 50 per cent ferrosilicon for 1928 delivery, and current quotations are $85, delivered, on contract, and $87.50 on spot sales. Spiegeleisen is quoted at $33, Hazzard, Pa., for the 19 to 21 per cent grade in carload lots. Ferromanganese is dull, the last sales having been at $90, seaboard.

Prices delivered Chicago: 80 per cent ferromanganese, $97.56; 50 per cent ferrosilicon, $85 to $87.50; spiegeleisen, 18 to 22 per cent, $40.76 to $41.76.

Plates.—The local plate market is being supported almost entirely by small orders from widely diversified sources. Oil storage tank steel on inquiry does not total more than 3000 tons, and there appears to be no assurance that it will be placed. Specifications from car builders are light, and no buying movement in railroad equipment is in prospect. Car shops have already cut operations to about 30 per cent of capacity, and the tendency is still downward. Miscellaneous orders for plates are a trifle more liberal, and while backlogs are not growing, users in manufacturing lines are anticipating their requirements further in advance and rolling schedules are the best in five or six weeks. The bulk of going plate business is being taken at 1.90c., Chicago.

Mill prices on plates per lb.: 1.90c., base, Chicago.

Structural Material.—Delays in bringing pending structural projects to a head are working a hardship on local fabricators, who are facing curtailment of production, which at no time has reached the volume normally expected at this time of the year. New undertakings continue to come up for figures, but as a usual thing they serve only to add to the already long list of buildings for which financial support apparently cannot be found. The Medinah Athletic Club building is being redesigned, and disagreements as to air rights are holding back both the Marshall Field & Co. warehouse and the Chicago *Daily News* building. Three new projects are announced for the loop district in Chicago, among these being a Tower Club building. Shops that cater to business that calls for lots of less than 50 tons each are active. Mill prices for plain material are at 1.90c., Chicago, on the bulk of going tonnage. In some cases mills have named 1.85c., and in one case steel was sold at 1.80c. to an Indiana fabricator for ultimate delivery into northern Ohio by a route taking a fabrication-in-transit rate.

Mill prices on plain material per lb.: 1.90c., base, Chicago.

Reinforcing Bars.—Sales, except of rail steel, are light, and prices of billet steel reinforcing bars in lots larger than 200 tons each are untested. Prices on small tonnages are steady at 2.45c. to 2.65c. per lb., local warehouse, but the market is weak on lots that should command 2.30c. per lb. Fresh inquiry is moderately active, but uncertainty as to financing makes it doubtful whether bending shop operations can be maintained at the present rate, which is close to 90 per cent of capacity. Rail steel reinforcing bars are bringing 1.90c. to 2c., Chicago, in a market that is active. Lettings and fresh inquiries are shown on page 759.

Bars.—The soft steel bar market is more active as a result of larger requirements by makers of cold-drawn steel. Forward buying has not made its appearance to any great extent, it being evident that most buyers still prefer to move cautiously. Individual specifications average larger than last month, and this is taken by producers as an indication that some lines of industry are speeding up. A common insistence on prompt delivery indicates that stocks in the hands of users are still at a minimum. The rate at which farm equipment plants are operating is estimated at 90 per cent. Tractor manufacturers are running at capacity, and tillage machinery producers have laid out larger schedules than in the summer months. Several farm equipment makers have indicated their confidence by announcing their steel needs until the end of October. Mill prices in soft steel are 1.90c., Chicago. Buying of alloy steel bars is more active, but the bulk of it is in small lots, indicating little interest in fourth quarter requirements. Sales of iron bars are light, and specifications, except from the railroads, are in small volume. Producers are still naming 2c., Chicago, as the going price, but resistance is developing and prices cannot be said to be firm. Demand for rail steel bars is steady. Specifications for September are running a little ahead of those in August, and shipments more nearly match production, as a smaller tonnage is being set aside for fall fence post deliveries. New buying is in fair volume and individual orders are larger, but users are not committing themselves beyond 30 to 45 days. Mill prices for rail steel bars lack strength at 1.90c., Chicago.

Mill prices per lb.: Soft steel bars, 1.90c. base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.90c., base, Chicago.

Sheets.—With production at 65 to 70 per cent of hot mill capacity, mills have accumulated backlogs covering two to three weeks of work. New buying, practically all in small lots, has gained slightly. Prices are steady, but the lack of interest in future requirements has led mills to withhold announcing fourth quarter prices. Jobbers are taking out larger quantities, and agricultural implement manufacturers have laid out

heavier schedules for the next 30 days. A moderate demand for Nos. 14 and 16 gage blue annealed sheets is coming from manufacturing consumers. There is no change in the rate of specifications from the automobile builders served by mills in this district.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.15c.; No. 24 galvanized, 4c.; No. 10 blue annealed, 2.40c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Bolts, Nuts and Rivets.—Sellers have announced a contract price for fourth quarter on large rivets of $2.85. An effort will still be made to obtain $3.10 on miscellaneous business of the less desirable kind. Specifications for bolts, nuts and rivets are not holding up, and September orders are showing little improvement over the previous month. Fourth quarter contracting is well under way.

Wire Products—Specifications from the manufacturing trade are of moderate size, but the fall demand from jobbers has not swung into motion. Mill prices on wire and wire products are shown on page 743.

Rails and Track Supplies.—The market is dull, and rail production in this district has slipped to 25 per cent of capacity. Miscellaneous orders for track fastenings are small, and output does not average above 55 per cent of local mill capacity.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36 to $38. *Per Lb.:* Standard railroad spikes, 2.90c.; track bolts with square nuts, 3.90c.; steel tie plates, 2.35c.; angle bars, 2.75c.

Cast Iron Pipe.—Lower prices are indicated by bids at Detroit. The low bid on the 6-in. and 8-in. sand cast pipe was made by the American Cast Iron Pipe Co. at $33.95, delivered, or $26.03, Birmingham, the freight rate being $7.92. The Lynchburg Foundry Co. bid $36.20, delivered, on 30 and 36-in. sand cast pipe. The United States Cast Iron Pipe & Foundry Co. put in a price of $39 on the 6 and 8-in. sand cast pipe and $37.50, delivered, on the 30 and 36-in. The National Cast Iron Pipe Co. has taken 300 tons of 6 and 8-in. pipe for Kenosha, Wis., at $27.40, Birmingham, or $35.90, delivered. Saginaw, Mich., has closed with the National company for 120 tons of 20-in. and 124 tons of 6 to 16-in. pipe at $35.90, delivered, or $27, Birmingham. Anchorville, Mich., is in the market for 800 tons of 4 to 10-in. Class B pipe. Fresh inquiry from all classes of buyers, as well as new business, is measurably lower than a week ago, and competition among pipe producers is unsually keen. Reports as to deliveries vary, but there are only a few sizes of pipe that cannot be had in less than 10 days.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $34.20 to $37.20; 4-in., $38.20 to $41.20; Class A and gas pipe, $1 extra.

Coke.—This market is steady, and shipments are holding to the higher rate reached earlier in the month. Prices are $9.75, local ovens, and $10.25, delivered in the Chicago switching district.

Old Material.—A consumer of heavy melting scrap has purchased a round tonnage at $12.35, delivered, but another buyer is said to be still offering $12.75 for a higher grade. Taken as a whole, this market lacks strength. Smaller users are taking scrap as requirements demand, and there is no evidence of accumulations either in the hands of buyers or sellers. The rerolling rail market is dull, the best offer from a user being $15.50 per gross ton, delivered, as contrasted with $15, on track, obtained by the railroads. Country scrap is not a factor in this market, which appears to be well balanced when the supply of railroad and industrial scrap is compared with consumer demand. Prices on cast grades are lower, largely because of an oversupply. Cast iron borings are still difficult to get, but users who are substituting busheling are taking a firm stand at $11.25 as their best offer. Shipments of railroad scrap, while coming out steadily, are not following sales so closely as was the case earlier in the year. The Santa Fe is offering 1200 tons of heavy melting steel, included in a list of 7000 tons, and the Chicago, Milwaukee & St. Paul will sell 2000 tons.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.25 to $12.75
Shoveling steel	12.25 to 12.75
Frogs, switches and guards, cut apart, and miscellaneous rails	14.00 to 14.50
Hydraulic compressed sheets	10.50 to 11.00
Drop forge flashings	9.25 to 9.75
Forged, cast and rolled steel carwheels	15.50 to 16.00
Railroad tires, charging box size	15.50 to 16.00
Railroad leaf springs, cut apart	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.25 to 14.75
Coil springs	15.50 to 16.00
Low phosphorus punchings	14.25 to 14.75
Electric Furnace Grades:	
Axle turnings	12.50 to 13.00
Blast Furnace Grades:	
Axle turnings	11.00 to 11.50
Cast iron borings	10.75 to 11.25
Short shoveling turnings	10.75 to 11.25
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	15.25 to 15.75
Cupola Grades:	
Steel rails less than 3 ft	15.50 to 16.00
Angle bars, steel	14.00 to 14.50
Cast iron carwheels	14.50 to 15.00
Malleable Grades:	
Railroad	13.75 to 14.25
Agricultural	13.00 to 13.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	19.00 to 19.50
Iron car axles	20.50 to 21.00
Steel car axles	17.75 to 18.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.50 to 11.00
No. 1 busheling	9.25 to 9.75
No. 2 busheling	5.25 to 5.75
Locomotive tires, smooth	13.75 to 14.25
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.50 to 14.00
No. 1 agricultural cast	13.00 to 13.50
Stove plate	13.00 to 13.50
Grate bars	11.75 to 12.25
Brake shoes	11.00 to 11.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.05c. to 2.15c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.20
Common wire nails, base per keg	$2.85 to 2.95
Cement coated nails, base per keg	2.95

British Iron and Steel Output in August

LONDON, ENGLAND, Sept. 13.—(*By Cable*).—August pig iron production was 596,100 gross tons and that of steel ingots and castings was 644,500 tons, a decline from July. In that month pig iron was 645,800 tons and steel was 682,900 tons.

The comparison of this year's output with the monthly production in recent years is shown by the following table in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Average monthly	855,600	638,600
1920—Average monthly	669,500	755,600
1922—Average monthly	408,500	490,100
1923—Average monthly	620,000	706,800
1924—Average monthly	609,900	685,100
1925—Average monthly	519,700	616,400
1926—Average monthly	203,500	296,700
1927—First quarter, per mo	559,100	835,700
1927—Second quarter, per mo	683,500	826,600
1927—July	645,800	682,900
1927—August	596,100	644,500

August steel output is the smallest this year with pig iron the lowest since March.

New York

Blast Furnaces Advance Quotations—Sheets and Hot Strips Weaken

NEW YORK, Sept. 13.—Two Buffalo producers of pig iron have advanced prices to $17, base furnace, for foundry iron, and another has raised quotations to $16.25. The advances, which follow the accumulation of fairly comfortable backlogs, have not yet undergone a real test, although a few small sales are reported to have been made at as high as $17. Demand in this district has subsided, and brokers' sales for the week totaled only about 6000 tons. The largest individual purchaser was Taylor & Co., Brooklyn, which closed for approximately 1000 tons, largely Buffalo iron. A New Jersey melter is in the market for 1000 tons of foundry, but otherwise current inquiries are small. A cargo of 700 tons of Indian pig iron is scheduled to arrive at Boston this week. Virtually all of this tonnage is reported to have been sold, mainly in New England. The Port Henry, N. Y., furnace, which was recently blown out, is expected to be put back in blast in the latter part of October.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25 (all rail)	$20.91 to $21.91
No. 2 plain fdy. (by barge, del'd alongside in lighterage limits N. Y. and Brooklyn)	18.50 to 19.50
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 22.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Ferroalloys.—Specifications on contract of ferromanganese and spiegeleisen are reported as considerably better this month than in August or July. This is also true of ferrosilicon and ferrochromium. New business in the manganese alloys is very light, there being almost nothing in carload and small lots. An inquiry for 30 tons of ferromanganese for October delivery is noted.

Reinforcing Bars.—There has been some improvement in this market since the beginning of the month, but business is still rather quiet. Small jobs let during the last week have been responsible for a fair tonnage, but there have been few sizable awards. The bars have not yet been purchased for the highway approaches to two proposed bridges between Staten Island and New Jersey. About 500 tons will be required. Several jobs that will take 100 to 200 tons each have been added to pending projects in the last few days. Prices are unchanged.

Prices per lb. on billet steel reinforcing bars: From mill, 1.90c., Pittsburgh. Out of New York warehouse, 3.05c. to 3.15c., delivered at job. Out of Youngstown warehouse, 2.40c., Youngstown, or 2.77½c., delivered New York.

Finished Steel.—With new business this month not up to expectations, fresh weakness in prices of sheets, hot rolled strip steel and plates has developed. The weakness in sheets was brought about partly by the competition of strip sheet mills. Blue annealed has been sold at 2.15c., Pittsburgh, a cut of $2 a ton from the 2.25c. quotation, which has been rather firmly held to since it was announced last May. Black sheets have been sold at 2.90c., Pittsburgh, and even as low as 2.85c. is reported. Similar weakness exists on galvanized sheets. The cuts on hot rolled strip steel have amounted to $1 and $2 a ton. The break in the plate market is said to be traced to a large order for a pipe line job which was recently taken by a mill at less than 1.70c., Pittsburgh. Whatever the cause, the fact is that weakness has developed rather rapidly in the past several days. On fair-sized lots there have been quotations and sales at 1.70c., while the smaller business has been taken at 1.75c., instead of at 1.80c., which has for some time ruled on the average-size orders. Steel bars have been held rather well at 1.80c., Pittsburgh, although a few exceptions have been made in the case of large preferential buyers. Efforts of structural mills to prevent further declines in prices of shapes have perhaps resulted successfully, but quotations are no higher. The spread between the lowest and highest prices is still several dollars a ton, which adds to the difficulty of naming a "market price." Carload lots or less range from 1.70c., Pittsburgh, to 1.75c. or 1.80c., but on the larger tonnages sales are being made at less than 2c., delivered New York. Structural tonnage this month is reported by the mills to be fairly large, and this on top of a good tonnage in August is giving structural mills a somewhat better operation than other lines of finished steel. The Structural Steel Board of Trade of New York reports that fabricated steel bookings in the metropolitan district in August, exclusive of elevated roads, subway work and bridges, was 32,000 tons, compared with 74,000 tons in July of this year and with 42,000 tons in August, last year.

Mill prices per lb. delivered New York: Soft steel bars, 2.14c.; plates, 2.04c. to 2.14c.; structural shapes, 1.90c. to 2.04c.; bar iron, 2.14c.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished steel shafting and screw stock—	
Rounds and hexagons	4.00c.
Flats and squares	4.50c.
Cold-rolled strip, soft and quarter hard,	5.75c. to 6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage)	3.89c.
Long terne sheets (No. 24 gage)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
⅓-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	4	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	4.00c.
No. 22	4.15c.
No. 24	4.20c.
No. 26	4.30c.
No. 28*	4.45c.
No. 30	4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c. to 4.60c.
No. 16	4.45c. to 4.70c.
No. 18	4.60c.
No. 20	4.75c.
No. 22	4.80c.
No. 24	4.95c.
No. 26	5.20c.
No. 28*	5.45c.
No. 30	5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Warehouse Business.—September seems to be comparing favorably with July and August in volume of orders, but no increase in demand has yet developed. Black and galvanized sheets continue weak, with concessions of $1 to $2 per ton offered on desirable business. There is a fair demand for bars and small shapes, and purchasing of plates is of moderate proportions.

Cast Iron Pipe.—The downward tendency of prices continues, with competition for desirable tonnages bringing out occasional concessions below the commonly quoted base of $28 per net ton, Birmingham. In a few instances producers are endeavoring to stem this downward movement, but thus far without much success. The Department of Purchase, New York, will open bids Sept. 21 on about 4400 tons of pipe, mostly 12-in. Denville, N. J., has been in the market for about 1250 tons of 6 and 8-in. water pipe, accepting alternate bids on centrifugally cast pipe. The American Construction & Securities Co., New York, has been taking bids on about 1700 tons of pipe and is expected to close the business in a few days. Except for these few large inquiries, business is confined to small lots purchased by private companies.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Coke.—While the market is slightly firmer, prices show no advances. Standard foundry for prompt shipment still ranges from $4 to $4.50 per net ton, Connellsville, with contracts for delivery to the end of the year ranging up to $5.25 and $5.35. Furnace grade is quoted for prompt shipment at $3 to $3.25. Delivered prices on Connellsville foundry coke are: To northern New Jersey, $8.03 to $8.28; to New York or Brooklyn, $8.79 to $9.04; to Newark or Jersey City, N. J., $7.91 to $8.16. Prices on by-product foundry coke are $9.59 to $10.77, delivered Newark or Jersey City.

Old Material.—Quietness continues on all grades, and prices are substantially unchanged, except for a slight downward tendency on blast furnace and machine shop turnings. Borings and turnings are being purchased by brokers at $10 per ton, delivered either to Bethlehem or Swedeland, Pa. Chemical borings are inactive, with the plant of one consumer in this territory moved to Buffalo and another consumer out of the market at present. Stove plate for steel mills is quoted at $8.75 to $9.25 per ton, delivered to users at Phoenixville and Harrisburg, Pa. No. 1 heavy melting steel is unchanged at $13.50 per ton, delivered eastern Pennsylvania, with shipments moving to Claymont, Del., and Bethlehem and Conshohocken, Pa. Yard grade is quoted at $11.50 per ton, delivered Phoenixville and Harrisburg, Pa., and $10.75 to $11.25 per ton, delivered to Pottsville, Pa. There is a small tonnage of scrap on lists to be opened this week by the railroads, including the Lehigh Valley Railroad, Central Railroad of New Jersey and the Delaware, Lackawanna & Western.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	7.00 to 8.00
No. 1 heavy breakable cast	11.50 to 12.50
Stove plate (steel works)	8.75 to 9.25
Locomotive grate bars	8.75 to 9.25
Machine shop turnings	7.00 to 7.50
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furnace or steel works)	7.25 to 7.50
Mixed borings and turnings	6.50 to 7.50
Steel car axles	16.25 to 17.25
Iron car axles (nom.)	23.50 to 24.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.25
Forge fire	6.50 to 7.00
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought, long	10.50 to 11.00
Rails for rolling	10.25 to 10.75
Cast iron carwheels	11.50 to 12.00
Stove plate (foundry)	9.00 to 9.75
Malleable cast (railroad)	10.25 to 10.75
Cast borings (chemical)	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$14.00 to $14.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	12.50 to 13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to 12.00

The Valley Mold & Iron Corporation has removed its general offices from Sharpsville, Pa., to Hubbard, Ohio, where it recently started its new ingot mold plant.

Cleveland

Business in Finished Steel Shows Slight Gain—Pig Iron Buying Subsides

CLEVELAND, Sept. 13.—Business in finished steel on the whole shows a slight gain over last month, but the volume of orders for most mill products is still being restricted because of the limited demand from the automotive industry. While sales for the most part are still in small lots, a few orders for round tonnages came out during the week. While a few of the Michigan automobile companies are operating nearly at capacity, the industry as a whole is still marking time awaiting the appearance of the new Ford cars. The Ford Motor Co. continues to buy steel in small quantities, evidently for experimental work, but has not come in the market for quantities required to get under production. The belief has now become rather general that it may be close to New Year before the Ford company gets into large scale operation on its new models. The unsettled condition in the automotive industry was aggravated during the week by the holding up of steel orders by another manufacturer of low-priced cars, the reported reason for which is that a change will be made in its recently brought-out models.

Orders for plates show a fair gain. Tank and boiler shops and manufacturers of some lines handling equipment are placing car lots more freely than for some time. Some plate business is coming from Lake shipyards for repair work. Inquiry for structural steel for building work is light. Prices are holding firmly at 1.80c., Pittsburgh, for steel bars, plates and structural material for the ordinary run of orders, but some concessions have appeared on attractive tonnages. A local mill has opened its books for plates for the fourth quarter at 1.80c., Pittsburgh, and has closed a number of contracts on that basis. On steel bars 1.80c., mill, is the ruling Cleveland mill price.

Pig Iron.—The market has not shown a great deal of life in the past week, and the recent tapering of sales has brought producers to the conclusion that buying is about over until consumers come in the market for their first quarter requirements. Cleveland producers sold about 15,000 tons during the week, but have very little new inquiry. Some of the furnaces are comfortably filled with orders for the remainder of the year and show less eagerness to take business, at least at price concessions, than a few weeks ago. Lake furnace prices are holding rather firmly at $17.50 for foundry and malleable iron, and Cleveland producers continue to quote that price at furnace for outside shipment, although they state that they are losing some business because of price, indicating that a price of $17.25, furnace, has not disappeared. However, a Cleveland producer during the week sold 500 tons of No. 2X iron in Cincinnati at $18, or equivalent to $17.50, base. In Michigan a price of $18.50, furnace, is evidently being maintained. Some business was taken in that State at $18, but one producer a week ago announced the restoration of the $18.50 price. The only inquiry of any size pending is from an Indiana melter for 1000 tons of foundry and malleable iron. Expectations of the pig iron producers as to

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 3.00c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.65c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.90
No. 9 galvanized wire, per 100 lb	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

the demand from the automobile industry are not being realized. An increase of shipping orders from this source was looked for this month, but this has not materialized, although most automobile foundries are taking as much iron this month as in August.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$19.00
Southern fdy., sil. 1.75 to 2.25	23.25
Malleable	19.00
Ohio silvery, 8 per cent	31.50
Basic, Valley furnace	17.25
Standard low phos., Valley furnace	27.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—A limited amount of late season buying has developed, and one seller has taken several orders aggregating 60,000 tons, and others, a few lots up to 10,000 tons. The balance of Lake Superior ore on docks at Lake Erie ports Sept. 1 amounted to 6,074,966 tons, as compared with 5,894,078 tons on the same date a year ago. Receipts at these docks during August were 6,451,055 tons, and for the season until Sept. 1, 24,299,794 tons, as compared with 24,639,858 tons during the corresponding period last year. Shipments from Lake Erie ports in September were 4,254,820 tons, and for the season until Sept. 1, 18,064,091 tons, as compared with 18,765,056 tons up to Sept. 1 last year.

Semi-Finished Steel.—Specifications continue light and are not expected to improve until there is an increased demand for finished steel from the automotive industry. Sheet mills are showing no interest in fourth quarter contracts for sheet bars. Wire rods are not firm, concessions of $1 a ton to $42, Cleveland, appearing for current orders.

Sheets.—While a slight improvement is noticed in the demand for sheets, the need of some of the mills for orders has increased, as they have little tonnage on their books. Orders from the automotive industry show little, if any, gain and are limited to early needs. The demand for metal furniture stock has picked up somewhat. Some of the mills have opened their books for the fourth quarter at present prices. Published prices are being maintained in this market, but with the present need of the mills for orders, prices are expected to meet a severe test when attractive inquiries come out. The only shading in evidence is on blue annealed sheets, which in a limited range of widths and gages can be purchased on a strip sheet basis equivalent to 2.15c. for blue annealed.

Strip Steel.—Small lot orders for hot-rolled strip are slightly more plentiful than recently, but many consumers have not yet used up their old low-priced stocks. Cold-rolled strip is in only moderate demand. Consumers are not showing an interest in contracts for the fourth quarter. The market appears firm on both hot and cold-rolled strip.

Warehouse Business.—The demand is moderate, with sales showing a slight gain over August. Jobbers contend that because of their ability to make quick deliveries mills are taking some business that should go to warehouses. Considerable irregularity in steel bar prices is appearing in sections where Pittsburgh competes with Cleveland jobbers.

Reinforcing Bars.—New work aggregating 2500 tons is pending. Rail steel bars are unchanged at 1.65c., mill, and manufacturers of these bars are not attempting to compete locally with billet steel bars.

Fluorspar.—Some activity has developed recently in gravel fluorspar, although consumers are not expected to buy for their winter requirements until next month. Competition has resulted in a softening of prices, and a sale of round tonnage was made during the week at $16, mines. For small lots producers are holding to $16.50, mines.

Alloy Steel.—Some small-lot orders are coming from the automobile parts manufacturers, giving a slight stimulus to the market, which has shown little life for several weeks. Sales are being made at the quotations in our price table.

Bolts, Nuts and Rivets.—The leading local rivet manufacturer this week opened its books for the fourth quarter at its third quarter prices, or $2.75 per 100 lb. for large rivets for contracts and $3 for non-contracting customers, who for the most part are buyers whose requirements are not large enough to warrant the placing of contracts. Buyers are given until Oct. 20 to place contracts. The same manufacturer has reaffirmed its present price of 70 and 10 per cent off list, Cleveland and Pittsburgh, for small rivets for the fourth quarter. Rivet orders show a fair gain. Bolt and nut manufacturers have taken a few fourth quarter contracts since they established present prices for that delivery. The demand for bolts and nuts shows a slight gain over last month. The industry is operating at about 60 per cent of capacity.

Coke.—There is a little activity in foundry heating coke, which ranges from $2.90 to $3.10 at ovens. Connellsville foundry coke is unchanged at $4 to $5.35, ovens.

Old Material.—The market is virtually at a standstill. With good stocks and shipments coming in on contracts, mills have all the material they need and are waiting for their own orders to improve before making additional purchases. Dealers have little scrap to buy against existing orders. While scrap is more plentiful than recently, dealers are not showing a disposition to shade prices to get business. Dealers have been able to buy blast furnace scrap below $11 only in very limited quantities and made some purchases during the week at $11.15.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$14.00 to	$14.25
No. 2 heavy melting steel	13.50 to	13.75
Compressed sheet steel	13.25 to	13.50
Light bundled sheet stampings	11.50 to	12.00
Drop forge flashings	12.50 to	13.00
Machine shop turnings	9.00 to	9.25
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	13.75 to	14.00
No. 1 busheling	11.50 to	11.75
Pipes and flues	10.00 to	10.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades		
Low phosphorus forging crops	16.50 to	17.00
Low phosphorus, billet bloom and slab crops	17.00 to	17.50
Low phosphorus sheet bar crops	16.00 to	16.50
Low phosphorus plate scrap	16.00 to	16.50
Blast Furnace Grades		
Cast iron borings	11.00 to	11.15
Mixed borings and short turnings	11.00 to	11.15
No. 2 busheling	11.00 to	11.15
Cupola Grades		
No. 1 cast	16.50 to	17.00
Railroad grate bars	12.00 to	12.50
Stove plate	12.00 to	12.50
Rails under 3 ft	18.00 to	18.50
Miscellaneous		
Railroad malleable	15.50 to	16.00
Rails for rolling	16.25 to	16.50

Philadelphia

Steel Volume No Larger, Some Easing in Prices—Pig Iron Weak

PHILADELPHIA, Sept. 13.—There is keen disappointment in the fact that September has brought no improvement in the volume of business in finished steel, pig iron and old material. Prices of sheets, hot-rolled

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.65c. to 3.00c.
Plates, ⅜-in.	3.00c. to 3.20c.
Structural shapes	2.65c. to 3.00c.
Soft steel bars, small shapes and iron bars (except bands)	2.65c. to 3.00c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel, squares and flats	4.50c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to ⅛-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24)	4.35c.
Galvanized sheets (No. 24)	5.20c.
Blue annealed sheets (No. 10)	3.30c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

strip steel and plates are easier. Sheets, which have held fairly well for months, have given way, particularly the narrow widths of blue annealed which are forced to meet the competition of strip sheets, which are now being rolled up to 36 in. A surprising feature of the pig iron market is that there is so little buying for fourth quarter, most consumers apparently being covered for that period. Prices on pig iron continue weak. Although there are advances in a few items in the scrap list, the undertone of the market as a whole is not so strong as a few weeks ago.

Pig Iron.—Business in pig iron is of very small volume considering that the fourth quarter is so close at hand. Indications are that nearly all consumers have enough iron bought to see them through the remainder of the year unless there should be an unexpectedly large increase in their melt. In the absence of large tonnage inquiries, there is keener competition for the small and moderate-size orders, and furnaces have gone as low as $19.50 base, on tonnage that ordinarily is not considered attractive enough to bring out the lowest prices. One or two sellers have not dipped below $20. Standard low phosphorus iron is still quoted at $23 to $25, New York State furnace, the length of haul usually governing the furnace price. Copper-bearing low phosphorus iron remains at $24.50 to $25, furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.26 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76 to 21.76
East. Pa. No. 1X	21.26 to 22.26
Basic (delivered eastern Pa.)	20.00
Gray forge	20.50 to 21.00
Malleable	21.50 to 22.00
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	24.50 to 25.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	25.54
Virginia No. 2X, 2.25 to 2.75 sil.	26.04

Prices, except on low phosphorus, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Orders for billets are small and infrequent. Prices ruling are $33 to $34, Pittsburgh, for open-hearth rerolling quality and $38 to $39 for forging quality.

Ferromanganese. — Offers of $87.50, seaboard, for English ferromanganese have been turned down by agents of the overseas producers. The quotation remains at $90, but there is very little business.

Plates.—Prices on plates have weakened slightly in the past few days, but this has affected only the larger lots. Small lots—and those so designated usually run less than a carload under present hand-to-mouth buying conditions—are quoted at 1.80c., Pittsburgh, and this price is usually paid without objection. But on lots ranging from a carload upward quotations have dropped $1 a ton, or from 1.75c. to 1.70c., Pittsburgh. The volume of business has shown no increase. The Pennsylvania Railroad is taking bids on a passenger boat for operation between Cape Charles and Norfolk, Va., which will take a few thousand tons of steel. A water pipe line in north New Jersey, on which bids will soon be taken, will require about 30,000 tons of plates if steel pipe is selected.

Structural Shapes.—Compared with last month, the volume of business in structural shapes is declining, or at best holding its own. There is no gain in tonnage. Efforts of the mills to strengthen the price situation have kept quotations in check, but they are no higher. Usual quotations on carload lots are 1.70c. or 1.75c., Pittsburgh, but on larger lots prices are at least $2 a ton lower.

Bars.—The demand for steel bars is no larger so far this month than last, but the price remains unchanged at 1.80c., Pittsburgh. Bar iron is usually quoted at 2.12c., Philadelphia.

Sheets.—A Pittsburgh district mill which has recently started the operation of a mill producing strip sheets up to 36 in. wide has offered tonnage in this district at 2.10c. and 2.15c., Pittsburgh, depending on the quantity. This is blue annealed stock, which has in several instances forced the makers of blue annealed sheets to meet these prices on the narrow widths, though they have declined to do so on the larger sizes. Black sheets have also weakened to the extent of $2 a ton, but the situation on galvanized sheets is not so clearly defined. The sheet market has been well maintained for some months; hence the outcome of the present situation will be watched with interest by buyers and sellers alike.

Imports. — Last week's receipts from abroad at Philadelphia included the following: Pig iron from France, 500 tons; steel bars from Belgium, 13 tons, from France, 28 tons; structural shapes from Belgium, 60 tons, from France, 134 tons; manganese ore from Chile, 200 tons, from England, 50 tons; chrome ore from Portuguese Africa, 39 tons.

Old Material.—Cast scrap has gained somewhat in strength, but otherwise the old material market has not the firm undertone of a few weeks ago. At that time expectations of an increasing demand from consumers for fall consumption were more sanguine than are now held. No. 1 cast scrap is quoted at $16.50 to $17, delivered, and heavy breakable cast at $16. Steel pipe is slightly stronger, but other grades are unchanged.

Prices per gross ton, delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$14.00
Scrap T rails	$13.00 to 13.50
No. 2 heavy melting steel	11.50 to 12.00
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	11.00 to 11.50
Machine shop turnings (for steel works)	11.00 to 11.50
Heavy axle turnings (or equivalent)	12.50 to 13.00
Cast borings (for steel works and rolling mill)	11.50 to 12.00
Heavy breakable cast (for steel works)	16.00
Railroad grate bars	13.00 to 13.50
Stove plate (for steel works)	13.00 to 13.50
No. 1 low phos., heavy, 0.04 per cent and under	18.50 to 19.50
Couplers and knuckles	16.75
Rolled steel wheels	16.00 to 16.50
No. 1 blast furnace scrap	10.50
Machine shop turnings (for rolling mill)	11.50 to 12.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to 13.00
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	10.50 to 11.00
Steel rails for rolling	16.00 to 16.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.50 to 17.00
Cast borings (for chemical plant)	15.00 to 16.00

Automobile Situation Is Key to Youngstown Market

YOUNGSTOWN, Sept. 13.—Evidences accumulate of improved sentiment in the iron and steel trade of northeastern Ohio, but schedules do not yet reflect the betterment which it was believed mid-September would bring. This week the Republic Iron & Steel Co. starts its heavy bar mill at the Brown-Bonnell works, which has been idle for some time, indicating an improvement in demand for steel bars, which dropped to a low level during the summer. In steel sheets, miscellaneous requirements are coming through in a fairly active way and prices are firm. This week's schedules show 57 of 127 Mahoning Valley mills under power, including jobbing units. These heavier mills, rolling larger and heavier sheets, have been only intermittently active during the summer. Except for one idle strip mill, the Sharon Steel Hoop Co. is operating at capacity in its rolling mill departments at Sharon, Pa., and Youngstown. Its steel plant at Lowellville, Ohio, however, is averaging 70 to 75 per cent.

On the other side of the picture, however, is a reduction in operations by the Carnegie Steel Co. to 40 per cent, a decline from 45 per cent the week before and representing the lowest Carnegie rate in the Youngstown district in several years. This is due, however, directly to the reduced demand for steel from the automobile industry. The Carnegie company has 21 bar, hoop and strip mills in the Youngstown area, and the independents operate 15. The bulk of the output of these units goes into automobile steels.

Advices are current that the new Ford model will probably appear about Sept. 20, but these guesses are of course subject to revision, judging from previous predictions. The general feeling among steel makers is that the Ford situation is the key to the steel market in this district for the time being, because of the large capacity which is devoted to automobile steels.

San Francisco

Large Arrivals of Foreign Pig Iron and Coke — Pipe Line Projected

SAN FRANCISCO, Sept. 10 (*By Air Mail*).—Conspicuous in a week shortened by two holidays—Labor Day and Admission Day—have been the arrival at this port af 1300 tons of foreign pig iron and 3000 tons of English coke, and slightly heavier buying of fabricated structural steel. The situation in regard to prices is unchanged. There have been no tests of prices locally since early in August, when the Eastern mills advanced quotations on plates and shapes. Inquiry in all departments of the market is light.

Pig Iron.—A local importer during the week brought in 800 tons of Indian iron and 500 tons of special analysis iron from Luxemburg. About 300 tons of the Indian iron is for Los Angeles. Early in October a shipment of 1250 tons of Indian iron is expected to arrive at this port. Quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—While there has been a slight increase during the week in the number of lettings of fabricated structural steel, the awards total only 1905 tons. Fresh inquiry is confined to less than 100-ton lots. Locally, the largest project closed is 600 tons for a mill building in South San Francisco for the Pacific Coast Steel Co., which will do its own fabricating. The Minneapolis Steel & Machinery Co. is low bidder on 800 tons for a boxing arena here, and in Modesto, Cal., the Pacific Coast Steel Co. is low bidder on 150 tons for transmission towers for the Modesto Irrigation District. Eastern mills quote plain material at 2.40c., c.i.f. Coast ports.

Plates.—The Spring Valley Water Co., San Francisco, has applied to the State Railroad Commission for a permit to construct a new pipe line to carry 30,000,000 gal. of water from San Andreas Lake to the Laguna Honda reservoir. The estimated cost of the proposed pipe line is $2,200,000. This work includes enlarging the present Stanford Heights reservoir to a capacity of 5,000,000 gal., the construction of a new feeder line from Stanford Heights to Presidio Heights, alterations in pumping plants and other improvements. No lettings or inquiries of importance have been reported during the week. Eastern mills quote plates at 2.40c., c.i.f. Coast ports.

Bars.—Fresh inquiry for reinforcing bar steel is confined to small lots. Lettings during the week total 686 tons. The largest individual award, 300 tons for a building for the Mutual Stores, Inc., Oakland, Cal., was taken by a San Francisco jobber. No award has yet been made of 400 tons for the Lafayette dam for the East Bay Municipal Utility District, Oakland, Cal. Local concrete bar jobbers quote as follows: 2.75c. to 2.85c., base, per lb. on lots of 200 tons and from 3c. to 3.10c., base, for less-than-carload shipments.

Cast Iron Pipe.—Pasadena, Cal., has awarded 1304 tons as follows: 1094 tons of 6 to 12-in., Classes B and C, pipe to American Cast Iron Pipe Co., and 210 tons of 6-in. Class C and 16-in. Class B pipe to the United States Cast Iron Pipe & Foundry Co. No other letting of importance is reported. Cast iron pressure pipe, 6-in. and larger, is quotable at $43 per ton, f.o.b. dock, San Francisco.

Steel Pipe.—The Grinnell Co. of the Pacific has taken 531 tons of 6-in. welded seamless pipe for the municipal Water & Power Commission, Los Angeles.

Warehouse Business.—Inquiry is small, orders are light, and quotations are unchanged.

Coke.—A local importer during the week brought in 3000 tons of English beehive and by-product coke. Of this amount 1550 tons is for local consumption and the remainder, 1450 tons, is for Los Angeles. A fresh shipment of about 1000 tons is expected to arrive here within the next week or ten days. Quotations on foundry coke are unchanged, as follows:

English beehive coke, $15 to $16 per net ton at incoming dock; English by-product $12 to $13, and German by-product, $11.50 to $12.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.10c
Small angles, ⅞-in. and over	3.10c.
Small angles, under ⅞-in	3.60c.
Small channels and tees, ¾-in. to 2¾-in.	3.70c.
Spring steel, ¼-in. and thicker	5.10c.
Black sheets (No. 24)	3.85c.
Blue annealed sheets (No. 10)	4.90c.
Galvanized sheets (No. 24)	5.45c.
Structural rivets, ½-in. and larger	5.50c.
Common wire nails, base per keg	$3.45
Cement coated nails, 100-lb. keg	3.45

St. Louis

Better Demand for Steel from Southwest — Foundry Melt Gains

ST. LOUIS, Sept. 13.—While sales of pig iron in the past week showed a marked falling off, there was a heavy increase in specifications against contracts as a result of a gain in melt after the Labor Day holiday. Sales for the week amounted to about 1500 tons. Of 1200 tons booked by the Granite City maker, 200 tons was purchased by a St. Louis stove manufacturer and 200 tons each was placed by a Springfield, Ill., and a Peoria melter. No sizable inquiries are pending, but a number of melters in the district are said to be preparing to place some last quarter business. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	21.66
Southern No. 2 fdy., delivered	21.67
Northern malleable, delivered	21.66
Northern basic, delivered	21.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—There is an especially good demand for the larger sizes of domestic grade for hot air furnaces. Foundry coke is also in good demand because of an increase in melt and a desire to add to reserves.

Finished Iron and Steel.—Mills report that within the past week there have been substantial sales of plates, shapes and bars in Oklahoma, indicating a revival of activity in the oil fields. Buying of galvanized sheets by Arkansas interests also has been heavier, probably because of flood replacement work. The sheet market is firmer than for some time. In most lines specifications against contracts have been heavier since the first of the month. Warehouse business has been disappointing so far this month, being about 20 per cent below expectations. Very few steel fabricating projects are being awarded.

Old Material.—A canvass of all mills in the St. Louis industrial district discloses that their stocks of scrap are sufficient to take care of all requirements based on their present bookings in finished products and that there will be no further buying of old material until their order books justify it. Prices are no attraction,

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.80c.
Galvanized sheets (No. 24)	5.35c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.60c.
Boiler rivets	3.80c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller	70
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped	60
Hot-pressed nuts, hexagons, blank or tapped	60

since the mills prefer to have the cash rather than raw material in their yards. In view of this attitude, prices have not been changed for the last two weeks. The relaying rail market is showing more life than for some time, a number of small orders having been received from coal mines. Railroad lists include: Chesapeake & Ohio, 7000 tons; Santa Fe System, 6900 tons; Wabash, 3500 tons; Chicago, Milwaukee & St. Paul, 2600 tons; Missouri Pacific, 1000 tons; Chicago & Eastern Illinois, 800 tons; Nickel Plate, 700 tons; Big Four, 500 tons (sidetrack relaying rails); Kansas City Southern, 600 tons, and Pullman Co. (St. Louis), 350 tons.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$12.25 to $12.75
No. 1 locomotive tires	14.25 to 14.75
Heavy shoveling steel	12.25 to 12.75
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.75 to 15.25
Railroad springs	15.25 to 15.75
Bundled sheets	8.50 to 9.00
No. 2 railroad wrought	12.25 to 12.75
No. 1 busheling	10.25 to 10.75
Cast iron borings	9.25 to 9.75
Iron rails	12.50 to 13.00
Rails for rolling	15.50 to 16.00
Machine shop turnings	6.75 to 7.25
Steel car axles	19.00 to 19.50
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	20.00 to 20.50
No. 1 railroad wrought	11.00 to 11.50
Steel rails, less than 3 ft	15.50 to 16.00
Steel angle bars	12.75 to 13.25
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	15.00 to 15.50
Railroad malleable	13.50 to 14.00
No. 1 railroad cast	14.50 to 15.00
Agricultural malleable	12.50 to 13.00
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Toronto

Pig Iron Producers Open Books for Fourth Quarter—Scrap Quiet

TORONTO, ONT., Sept. 13.—Expected advances in pig iron prices have failed to materialize, and as the beginning of fourth quarter is but a few days in the future, local blast furnace representatives have opened their books and are now accepting new contract business. Inquiry for last quarter is fairly active, indicating a good movement of iron during the next three months, but despite this fact contract placing has not been brisk. Several melters have come forward with contracts, but others do not appear in any hurry to cover. Producers in turn, while accepting orders that come their way, are not pushing for new business, being under the impression that higher prices may yet develop. Spot sales are still in good volume. Water shipments from the various producing centers into Quebec and Ontario are frequent. Consumers who can handle or stock 500 or 600 tons of iron are now accepting water delivery and are consequently benefiting by the lower freight rates. Imports of iron continue high and competition in some sections of the country is active, but with the exception of purchases by the agricultural implement industry, Canadian producers are securing the greater part of the new business offered. Canadian pig iron prices are firm.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	26.00
No. 2 foundry, sil. 1.75 to 2.25	26.00
Malleable	26.00
Basic	25.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Following price reductions announced last week in the Montreal market, Canadian scrap markets have been without feature. Hand-to-mouth buying by Ontario and Quebec consumers has improved slightly, but demand in the aggregate is still light. Some inquiry has developed for scrap for last quarter, and a few contracts have been closed. Most consumers, however, have not come forward; others have had third quarter contracts on which deliveries have not been made extended into last quarter. Purchases by dealers are almost entirely for direct shipment to consumers, and there is very little old material being taken into the yards. Speculative buying by dealers has ceased to be a feature of the market. Montreal and Toronto prices are unchanged.

Dealers' buying prices:

	Toronto	Montreal
	Per Gross Ton	
Heavy melting steel	$9.50	$9.00
Rails, scrap	10.00	10.00
No. 1 wrought	10.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	8.00
Cast borings	7.50	6.00
Steel turnings	7.00	7.00
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	17.00
Stove plate	....	12.50
Standard carwheels	....	16.00
Malleable scrap	....	14.00
	Per Net Ton	
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Birmingham

Pig Iron Dull — Mill Operations Improve — Coke Stronger

BIRMINGHAM, Sept. 13.—Although sizable orders for pig iron are lacking, current sales do not fall very far short of production. There has been a slight increase, however, in surplus stocks of foundry iron on furnace banks. In this district prices remain unchanged at $17.25 per ton, Birmingham, for No. 2 foundry, although concessions are reported to have been made in sales in other sections. With the exception of a shop manufacturing heating equipment, the larger melters of iron report no improvement in business.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$17.25
No. 1 foundry, 2.25 to 2.75 sil	17.75
Basic	17.25
Charcoal, warm blast	29.00

Rolled Steel.—With a majority of its open-hearth furnaces back in operation, the finishing mills of the Tennessee Coal, Iron & Railroad Co. are increasing their output. The car works of that company has booked an order for five steel barges for the Warrior River service. No purchases of railroad equipment are reported. The rail mill will operate steadily throughout the remainder of the year. Lighter forms of finished steel, such as hoops, bands and reinforcing bars, are in better demand. Shipments of cotton ties have been heavy, and further purchases are expected to develop before the cotton crop has been marketed. There is a fair movement of wire and nails from this district, and demand for sheets and plates has been favorably affected by steady operations among the smaller consuming industries. Mill prices on finished steel products are unchanged.

Cast Iron Pipe.—Production of pressure pipe is showing some improvement as compared with output a month ago. Centrifugal pipe is being produced on a larger scale, and the McWane Cast Iron Pipe Co. is now making "machine cast" pipe by a new method. Prices are weak, ranging from $29 to $30 per net ton, Birmingham, for 6-in. and larger diameters. Some of the larger manufacturers of soil pipe have increased their operations above the low rate that prevailed during the summer.

Coke.—Prices on foundry coke are stronger. Spot coke is again commanding $6 per net ton, Birmingham, while contract coke is firm at $5.50. Production has been steady, and little coke has been piled on the yards of independent ovens. The lighting of 49 modern Koppers ovens by the Alabama By-Products Corporation Oct. 14 will materially add to the output of this district.

Old Material.—There is a steady movement of

heavy melting steel, stove plate and cast scrap in shipments, but prices remain weak.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$10.50 to $11.00
Scrap steel rails	12.50 to 13.00
Short shoveling turnings	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Stove plate	13.00 to 14.00
Steel axles	16.00 to 17.00
Iron axles	16.00 to 17.00
No. 1 railroad wrought	11.00 to 12.00
Rails for rolling	13.00 to 14.00
No. 1 cast	14.00 to 15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.00 to 13.50

Boston

Low Prices Brought Out by 400-Ton Purchase of Pig Iron

BOSTON, Sept. 13.—A purchase of 400 tons of pig iron analyzing 2 to 2.50 per cent in silicon and 1 to 1.50 per cent in manganese by a New Hampshire foundry brought out some low prices, despite assurances by furnaces that prices are stronger. The iron, which was for prompt shipment, was bought from a stock sheet, having been selected from four casts. Some of it was bought as low as $19.40 a ton, delivered, and some as high as $20.65, with the average price per ton $20.25, delivered. It is reported that an eastern New York State furnace sold the iron. Large buyers insist that Buffalo iron can still be purchased at $16 a ton on cars, furnace, in the face of reports by furnaces that prices are 50c. to $1 a ton higher. It is contended by buyers that iron was offered in the past week on the $16 basis. So little iron from Virginia, Alabama, eastern and western Pennsylvania is moving that it is difficult to ascertain going prices; yet on the whole these irons appear easier rather than firmer. At least one New York State furnace is holding rigidly to $18 a ton at furnace for No. 2 plain, with the usual 50c. a ton silicon differential, on long freight hauls. Where the freight rate is small, it is asking $18.50 and $19 a ton, base. The only open inquiry in the market is one for 500 tons of No. 2X from the Gilbert & Barker Mfg. Co., West Springfield, Mass., for October, November and December delivery. The amount of iron in the yards of furnaces east of Buffalo is estimated at 115,000 tons. How much of this amount is sold is problematical.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	26.21
Virginia, sil. 2.25 to 2.75	26.71
Alabama, sil. 1.75 to 2.25	24.16 to 26.02
Alabama, sil. 2.25 to 2.75	24.66 to 26.52

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Imports.—Receipts of foreign iron at this port in August consisted of 1406 tons of Indian and 856 tons of Dutch, a total of 2262 tons, which compares with 1979 tons in July, this year, and 6347 tons in August, last year. Imports of ore in August comprised 26,180 tons from Bizerta and 8047 tons from Bona, Algeria, a total of 34,227 tons, contrasted with 30,852 tons in July, this year, and 26,232 tons in August, last year. No cast iron pipe was imported last month, whereas in July 1054 pieces were received and in June, 3381 pieces. Since March, when imports started this year, 16,406 pieces of pipe have been landed in Boston. Imports of foreign coal were resumed in August and included 6702 tons of Welsh and 5369 tons of Dutch, a total of 12,071 tons.

Cast Iron Pipe.—Private bookings by pipe foundries are in good volume, although somewhat smaller than a month ago. Indications strongly point to several municipalities asking for bids before the close of September. Prices here are lower than they were a fortnight ago in sympathy with those named at other centers. Quotations made openly today are $40.10 a ton on 6, 8, 10 and 12-in. diameters, delivered common Boston freight rate points, and $39.10 a ton on 16-in. and larger sizes. A differential of $4 a ton is asked on Class A and gas pipe.

Warehouse Business.—Warehouse sales so far this month have not developed so rapidly as was generally anticipated. The volume of shipments and deliveries is not much larger than it was in the closing days of August. Prices are rather elastic, owing to the desire by certain warehouses to secure turnover. Stocks are fairly well assorted but not heavy.

Coke.—Connellsville ovens that have been selling coke in New England in the past few months announce that, effective Sept. 15, prices will be 50c. a ton higher. Several foundries bought fuel in the past week in anticipation of the advance. Even at the advance, delivered prices in New England are still well below that on New England made fuel, which is $12 a ton within a $3.10 freight rate zone. Despite the growing activity of Connellsville coke in this territory, shipments by the New England Coal & Coke Co. and the Providence Gas Co. compare favorably with those of a year ago.

Old Material.—Prices for heavy melting steel are easier, but those for yard wrought, forge flashings, rails for rerolling and chemical borings appear somewhat firmer. Sentiment among brokers appears more optimistic; yet shipments of material out of New England do not seem to increase noticeably. Some of the largest brokers state that never before within their memory were shipments to Pennsylvania steel mills as light as they are today. Consequently, they believe that the mills will be forced to buy before long. The spread between prices for shafting and street car axles is growing wider each week, presumably because of the better analysis of the car axles. Good breakable No. 1 machinery cast is bringing more than textile cast today, a condition that has not existed for many months.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to $9.50
Scrap rails	8.00 to 8.50
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.00 to 6.50
Cast iron borings (steel works and rolling mill)	6.50 to 7.00
Bundled skeleton, long	6.00 to 6.50
Forge flashings	7.00 to 7.50
Blast furnace borings and turnings	6.25 to 6.50
Forged scrap	6.00 to 6.50
Shafting	13.00 to 13.50
Street car axles	18.50 to 19.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	8.00 to 8.50
Rails for rerolling	10.25 to 10.75
Cast iron borings, chemical	10.50 to 11.00

Prices per gross ton delivered consumers' yards:

Textile cast	$15.00 to $15.50
No. 1 machinery cast	15.50 to 16.00
No. 2 machinery cast	12.50 to 13.00
Stove plate	12.00 to 12.50
Railroad malleable	14.00 to 14.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.

A record in Great Lakes shipping is reported to have been shattered this week by the L. E. Block of the Inland Steel Co. fleet, when it carried a total of 15,622 tons of iron ore for delivery at the Indiana Harbor plant of that company. The L. E. Block is a standard type steamer, 638 ft. long with a 64-ft. beam and 33-ft. draught. Previously the boat had been loaded with 13,000 tons, although ship exports had figured its capacity to be 16,000 tons of iron ore.

Cincinnati

Pig Iron Quiet — Steel Buying Heavier — Scrap Grows Weaker

CINCINNATI, Sept. 13.—The pig iron market in the past week has been without feature. Total sales were less than 5000 tons, and current inquiries are inconsequential. Even though the fourth quarter is near at hand, buyers are reluctant to contract for their needs throughout that period. They are of the opinion that prices will not change much during the next month and that plenty of time remains in which to cover their requirements over the remainder of the year. Northern Ohio furnaces still dominate activities in this territory, the major orders having gone to Lake Erie producers who are asking from $17 to $17.50, base furnace, for foundry iron. Ironton makers are adhering strictly to $19, base furnace, but have booked only single carloads at that figure. A Rockwood, Tenn., company has reduced its price on foundry iron 75c. a ton to $17.25, base Birmingham, the figure at which Alabama iron is being held. Jackson County silvery iron furnaces are reported to be shipping a liberal amount of iron and are in a firm position so far as future orders are concerned. A Michigan melter has bought 2000 tons of malleable for fourth quarter delivery, while the Favorite Stove Co., Piqua, Ohio, has purchased 600 tons of foundry.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25....	$20.89
So. Ohio malleable .....$20.14 to	20.89
Alabama fdy., sil. 1.75 to 2.25...	20.94
Alabama fdy., sil. 2.25 to 2.75...	21.44
Tennessee fdy., sil. 1.75 to 2.25..	20.94
Southern Ohio silvery, 8 per cent	30.39

Freight rates: $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—An improvement in orders and specifications is reported by producers, who are optimistic about the outlook for business during the next two months. While the betterment extends into almost all lines, it is particularly noticeable in structural steel. The number of major projects to be awarded in the immediate future is unusual for this time of the year, among these jobs being 3000 tons for highway bridges in Tennessee and 1000 tons for a tobacco warehouse at Louisville. In addition, gas holder fabricators report that operations have been increased considerably in the past two weeks. The Stacey Mfg. Co. has received orders for six gas holders, which will take a total of 3100 tons of steel. Bars have been more active and are firm at 1.80c., base Pittsburgh, while structural shapes and plates also are selling on that basis. The sheet market has strengthened slightly, but sales are confined to small lots for immediate delivery. Neither producers nor consumers are inclined to close fourth quarter contracts, both being disposed to wait to see how trade will open up in the early fall. Sheet mills in this territory are at about 80 per cent of capacity, and no increase is anticipated in the next week. Prices are holding well, except in the South. There galvanized sheets for roofing purposes have been cut from $2 to $4 a ton in a struggle between a Southern mill and its Northern competitors to obtain current business. Blue annealed and black sheets are steady at 2.25c. and 3c., base Pittsburgh, respectively. Wire products are moving slowly. Common wire nails are bringing $2.69 a keg, delivered at Cincinnati.

Reinforcing Bars.—The West Virginia Rail Co. will furnish 350 tons of bars for a garage and 125 tons for a hospital in this city. The Eighth Street viaduct in Cincinnati, for which about 2500 tons of bars will be needed, will come up for bids this week. New billet bars are quoted at 1.80c., base Pittsburgh, and rail steel stock at 1.70c., base mill. Severe competition between producers of rail steel bars, however, has resulted in jobs being taken at from $1 to $2 a ton below the prevailing schedule.

Warehouse Business.—Sales declined somewhat in the past week, the holiday having interfered with trade. Bars, plates and shapes continue to lead in volume of business. Prices are firm and unchanged.

Coke.—While dealers have been expecting heavier buying of both foundry and domestic coke, the anticipated upward trend has failed to appear. Meanwhile the market continues in a desultory state. About a week ago there was a slight flurry in domestic grades, but this ended abruptly when a period of warm weather set in. There has been no improvement in foundry operations, and therefore foundry coke is lagging somewhat. The largest sale of the past week was 3000 tons of beehive furnace coke to a company in this district.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates: $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Curtailment of production by steel plants and by other consumers in this territory has had a depressing effect on the scrap market. Prices in many grades are sagging, some items having declined from 25c. to 50c. a ton. Indications are that an improvement will not take place for at least 30 days. Railroad lists closing this week include the Norfolk & Western, 4500 tons; Chesapeake & Ohio, 7000 tons; Southern, 7000 tons; Louisville & Nashville, 8000 tons, and Seaboard Air Line, 800 tons.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel.....$12.00 to	$12.50
Scrap rails for melting..... 13.00 to	13.50
Loose sheet clippings..... 9.00 to	9.50
Champion bundled sheets..... 9.50 to	10.00
Cast iron borings..... 8.50 to	9.00
Machine shop turnings..... 8.00 to	8.50
No. 1 busheling..... 10.00 to	10.50
No. 2 busheling ..... 7.50 to	8.00
Rails for rolling..... 13.50 to	14.00
No. 1 locomotive tires..... 14.00 to	14.50
No. 1 railroad wrought..... 11.00 to	11.50
Short rails ..... 17.50 to	18.00
Cast iron carwheels..... 13.50 to	14.00
No. 1 machinery cast..... 17.50 to	18.50
No. 1 railroad cast..... 14.00 to	14.50
Burnt cast ..... 8.00 to	8.50
Stove plate ..... 10.00 to	10.50
Brake shoes ..... 10.00 to	10.75
Railroad malleable ..... 12.50 to	13.00
Agricultural malleable ..... 12.00 to	12.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
Reinforcing bars	3.30c.
Hoops ..... 4.00c. to	4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel..... 4.75c. to	5.00c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue annealed sheets (No. 10)...	3.60c.
Structural rivets	3.85c.
Small rivets.....65 per cent off list	
No. 9 annealed wire, per 100 lb.....$3.00	
Common wire nails, base per keg..... 2.95	
Cement coated nails, base 100 lb. keg..... 2.95	
Chain, per 100 lb.....	
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.....$18.00	
4-in. 38.00	
Seamless steel boiler tubes, 2-in..... 19.00	
4-in. 39.00	

Scrap Weaker at Detroit — Pig Iron Advances

DETROIT, Sept. 13.—The old material market in the Detroit district has shown signs of weakness during the past week except on blast furnace materials. Long turnings, hydraulic compressed sheets, No. 1 busheling and flashings registered declines of 25c. to 50c. per ton. The only strengthening factor has been the small amount of material being released by producers, due to reduced automobile production. The market on pig iron in the district is very firm, with an advance of 50c. being quoted by the leading producers.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Heavy melting and shoveling steel .....$12.50 to	$13.00
Borings and short turnings..... 9.00 to	9.50
Long turnings ..... 7.50 to	8.00
No. 1 machinery cast ..... 17.00 to	18.00
Automobile cast ..... 18.50 to	19.50
Hydraulic compressed sheets.... 11.00 to	11.50
Stove plate ..... 11.50 to	12.50
No. 1 busheling ..... 10.00 to	10.50
Sheet clippings ..... 7.50 to	8.00
Flashings ..... 10.25 to	10.75

Buffalo

Pig Iron Orders Driven in Prior to Price Advances—Scrap Quiet

BUFFALO, Sept. 13.—Inquiry for pig iron is slack and confined to small lots. Several furnace companies have advanced their base quotations to $17 for foundry and $17.50 for malleable. Just prior to the increase in prices one interest sold 6000 tons, including four or five 500-ton lots of foundry and malleable. Some small lots of foundry have been sold at $17. Another furnace reports that it is figuring on a total of 2000 tons in inquiries, with a couple of 100-ton lots the feature. Altogether, it is estimated about 10,000 tons was sold in the district during the week. Most of the furnaces are fairly well booked for the rest of the year, one of them having only about 15,000 tons, including stocks, to sell for that period.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$16.00 to $17.00
No. 2X foundry, sil. 2.25 to 2.75	16.50 to 17.50
No. 1X foundry, sil. 2.75 to 3.25	17.50 to 18.50
Malleable, sil. up to 2.25	16.50 to 17.50
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Business shows signs of picking up. Demand for bars and shapes is better, and prices are firm. Sheet prices are steady, and inquiry is improving, particularly for automobile body material. Warehouse demand is good for all lines of material, with prices firm except on reinforcing bars, which shows signs of softness. New business in reinforcing bars is not so heavy as recently, a 150-ton warehouse being the only sizable inquiry now up for bids. Local mill operations range from 60 to 65 per cent.

Old Material.—The market is a little easier. One of the mills is taking a limited number of shipments against old orders. Some of the rails on a recent railroad list came to a local mill at a price of $16 per gross ton, sellers' tracks. There has been no new buying except of some specialties, such as knuckles and couplers. Purchases of railroad material have brought considerably higher prices than the mills have been offering dealers. Heavy melting steel is firm at the appended prices, and it is believed that any new purchases would bring somewhat above these figures.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons.	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.75 to $15.00
No. 2 heavy melting steel	14.00 to 14.25
Scrap rails	14.50 to 15.00
Hydraulic compressed sheets	12.25 to 12.50
Hand-bundled sheets	9.00 to 9.50
Drop forge flashings	11.50 to 12.00
No. 1 busheling	13.00 to 13.25
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	9.25 to 9.50
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.75 to 16.25
Railroad coil and leaf springs	17.00 to 17.50
Rolled steel wheels	15.75 to 16.25
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.00
Blast Furnace Grades	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	9.75 to 10.00
Cast iron borings	10.00 to 10.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	15.00 to 16.00
No. 1 railroad wrought	13.00 to 13.50
Cupola Grades	
No. 1 machinery cast	15.25 to 15.75
Stove plate	13.50 to 14.00
Locomotive grate bars	11.00 to 11.50
Steel rails, 3 ft. and under	16.50 to 17.00
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50
Industrial	15.00 to 15.50

Indicates No Steel Corporation-Du Pont-General Motors Merger

WASHINGTON, Sept. 13.—The investigation by the Federal Trade Commission of the relationship of E. I. du Pont de Nemours & Co., the United States Steel Corporation and the General Motors Corporation will not be affected by the statement sent last week to Col. William J. Donovan, assistant to Attorney General Sargent, by Irenee du Pont, chairman of the finance committee of the du Pont company, which disclosed that the latter had bought only 114,000 shares of Steel Corporation stock for $14,000,000 with no obligation to participate in its management through directorships or otherwise. The letter was in reply to an inquiry by Colonel Donovan regarding the growth of the du Pont company and its relationship with the Steel Corporation and General Motors. A copy of the reply also went to the economic division of the Federal Trade Commission.

It was pointed out that the commission has taken up a purely "economic" inquiry and that it has not charged violation of any law. At the same time the impression prevails that the inquiry of the commission may possibly lead to proposed legislation. This is based partly on the fact that Commissioner Abram F. Myers, who introduced the resolution calling for the investigation, is credited with saying that the business of the three organizations represents $25,000,000,000 annually and that governmental regulation is necessary for adequate protection of the public and investors. The du Pont letter, however, reveals that there is no plan for the merging of the Steel Corporation with either of the other two organizations and would indicate that the Steel Corporation is not again to undergo careful governmental scrutiny. The Department of Justice apparently is taking no action in any case, seeing there is no violation of anti-trust laws.

Mr. Myers is said to feel that there should be indirect control of corporations by publicity of their accounts and affairs and that this could be accomplished by a system of Federal licenses. It is apparently his opinion that this would be preferable to attempting to break up illegal combinations. Mr. Myers formerly was in charge of the anti-trust bureau of the Department of Justice.

Steel Corporation's Unfilled Orders in August Show Third Successive Gain

For the third month in succession the unfilled orders of the United States Steel Corporation increased in August. On Aug. 31 the books showed a total of 3,196,037 tons of orders yet to be filled—an increase of 54,023 tons over the 3,142,014 tons on July 31. The increase in July was 88,768 tons and in June it was 2305 tons. Previous to June there had been five months of decreases.

The following table gives the unfilled tonnage by months, commencing with January, 1925:

	1927	1926	1925
Jan. 31	3,800,177	4,882,739	5,037,323
Feb. 28	3,597,119	4,616,822	5,284,771
Mar. 31	3,553,140	4,379,935	4,863,564
April 30	3,456,132	3,867,976	4,446,568
May 31	3,050,941	3,649,250	4,049,800
June 30	3,053,246	3,478,642	3,710,458
July 31	3,142,014	3,602,522	3,539,467
Aug. 31	3,196,037	3,542,335	3,512,803
Sept. 30	.....	3,593,509	3,717,297
Oct. 31	.....	3,683,661	4,109,183
Nov. 30	.....	3,807,447	4,581,780
Dec. 31	.....	3,960,969	5,033,364

The high record in unfilled orders was 12,183,093 tons at the close of April, 1917. The lowest was 2,674,757 tons on Dec. 31, 1910.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Sept. 13	Sept. 12	Sept. 10	Sept. 9	Sept. 8	Sept. 7
Lake copper, N. Y.	13.25	13.25	13.25	13.25	13.25	13.25
Electrolytic copper, N. Y.*	13.00	12.95	12.95	12.95	12.95	12.95
Straits tin, spot, N. Y.	62.00	62.45	....	63.37½	63.62½	63.87½
Lead, New York	6.25	6.25	6.25	6.25	6.40	6.40
Lead, St. Louis	6.00	6.00	6.00	6.00	6.05	6.05
Zinc, New York	6.60	6.60	6.60	6.60	6.60	6.62½
Zinc, St. Louis	6.25	6.25	6.25	6.25	6.25	6.27½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Sept. 13.—August statistics for copper and zinc were decidedly favorable to sellers and prices are already a little firmer. Lead has again been reduced and the market is quiet. Tin prices have fallen to the lowest level in some time and buying has been moderately large.

Copper.—Statistics for August appeared today, Tuesday. There was a decrease in refined stocks of about 10,700 tons and an increase in copper in the blister form, leaving the reduction in copper above ground at about 8300 tons for the month. Output of mines, while a little larger than in July, showed an insignificant increase when the number of operating days is considered. And shipments to domestic and foreign consumers increased about 10,000 tons each. During the week the market has been exceedingly listless and one or two sellers have been willing to shade 13.25c., delivered in the Connecticut Valley, maintained by most producers. Small sales have been made at an average of about 13.20c., delivered, and these have taken care of the current light demand. Today practically all producers are on a 13.25c. delivered basis and the market is firm. Inquiries are more numerous and it is stated that consumers are not provided far ahead. A more active and stronger market is looked for in the near future. Already today quite substantial foreign sales have been made by one or two companies at the unchanged price of Copper Exporters, Inc., which is 13.50c., c.i.f. Hamburg. Lake copper is quoted at 13.25c., delivered.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	64.75c. to 65.75c.
Tin, bar	66.75c. to 67.75c.
Copper, Lake	14.50c.
Copper, electrolytic	14.25c.
Copper, casting	13.75c.
Zinc, slab	7.50c. to 8.50c.
Lead, American pig	7.50c. to 8.50c.
Lead, bar	9.75 to 10.75c.
Antimony, Asiatic	13.00c. to 14.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	41.50c. to 42.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	67.50c.
Tin, bar	69.50c.
Copper, Lake	14.00c.
Copper, electrolytic	14.00c.
Copper, casting	13.25c.
Zinc slab	7.75c.
Lead, American pig	7.50c.
Antimony, Asiatic	18.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	21.75c.
Babbitt metal, high grade	73.25c.
Solder, ½ and ½	39.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.25c. to 19.00c.
Copper, hot rolled	22.00c. to 23.00c.
Copper, cold rolled, 14 oz. and heavier,	24.25c. to 25.25c.
Seamless Tubes—	
Brass	23.12½c. to 24.12½c.
Copper	24.00c. to 25.00c.
Brazed Brass Tubes	26.25c. to 27.25c.
Brass rods	16.00c. to 17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.00c. to 11.25c.

Tin.—Spot Straits tin today at 62c., New York, is selling at the lowest price since July 7, 1926, and compares with the highest price since then of 72.50c., on Nov. 23, last year. This decline in the value of nearby tin is the feature of the market. It is due to large shipments from the Straits for the first ten days of this month, which are equivalent to October delivery at New York and which were over 3000 tons. This fact, plus the absence of demand from consumers, has caused sellers to be anxious for business which has been done at the expense of prices. Sales for the week ended Sept. 10 were about 1200 tons with the most active day, Thursday, Sept. 8, when 500 tons changed hands. Yesterday, between 300 and 400 tons was sold and today the market has been also quite active with fairly large sales reported. Prices at London have also declined about £6 per ton from those of a week ago, with spot standard quoted at £284, future standard at £278 10s., and spot Straits at £289 10s. The Singapore price today was £283 5s., a decline of about £5 per ton for the week. The London recessions are stated to be caused by the weakness in the New York market. Arrivals thus far this month have been 3437 tons with 6080 tons reported afloat.

Lead.—Another reduction in its contract price was made on Sept. 9 by the American Smelting & Refining Co. from 6.40c. to 6.25c., New York. The outside market is on the same level in the East with the metal quoted at St. Louis at 6c. Production is heavy and actual buying is light. Inquiry for November delivery is fairly large, but producers are not now eager to commit themselves for that position.

Zinc.—For the second month in succession stocks of refined metal declined, the falling off in August having been a little over 4700 tons. Shipments to both domestic and foreign consumers were very large at over 53,700 tons, with over 49,700 tons going to do-

Non-Ferrous Rolled Products

Lead full sheets were reduced ¼c. on Sept. 9 and are now being quoted at 10.25c. to 10.50c. There has been no change in the mill prices on bronze, brass and copper products since Aug. 3, and zinc sheets are still being quoted at the advance of Aug. 5.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.25c.
Copper, hot rolled	22.00c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	23.12½c.
Copper	24.00c.
Rods—	
High brass	16.00c.
Naval brass	18.75c.
Wire—	
Copper	15.25c.
High brass	18.75c.
Copper in Rolls	21.00c.
Brazed Brass Tubing	26.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	35.50c.
Tubes, base	45.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	19.25c.
Copper, hot rolled	22.00c.
Copper, cold rolled, 14 oz. and heavier	24.25c.
Zinc	11.00c.
Lead, wide	10.25c.
Seamless Tubes—	
Brass	24.62½c.
Copper	25.50c.
Brazed Brass Tubes	28.50c.
Brass Rods	16.00c.

mestic users. The production was about 49,000 tons so that domestic shipments exceeded output. Exports were only about 4000 tons and it is stated conditions are such that these cannot expand. While these statistics, which appeared a day or two ago, are bullish, the market has continued quiet with prices fairly firm at 6.25c. to 6.30c., St. Louis. Very little new business is reported, though modest sales are being made almost every day. Ore prices at Joplin are maintained at around $42 per ton, and production is fairly large at about 12,000 tons per week.

Antimony.—Chinese metal for spot delivery is slightly lower than a week ago at 11.50c., New York, duty paid, for all positions. The Ford Motor Co. is inquiring for a carload, about 25 tons, and this is interpreted by some to mean that the production of the new car is quite close at hand.

Nickel.—Ingot nickel in wholesale lots is quoted unchanged at 35c., with shot nickel at 36c. and electrolytic nickel at 39c.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.25c.	12.75c.
Copper, heavy and wire	11.00c.	12.00c.
Copper, light and bottoms	9.50c.	10.50c.
Brass, heavy	7.00c.	8.50c.
Brass, light	5.50c.	7.25c.
Heavy machine composition	8.75c.	10.125c.
No. 1 yellow brass turnings	7.75c.	8.25c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	5.125c.	5.375c.
Lead, tea	4.25c.	4.75c.
Zinc	4.00c.	4.50c.
Sheet aluminum	13.50c.	15.50c.
Cast aluminum	13.50c.	15.50c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 26c., New York, duty paid.

Non-Ferrous Metals at Chicago

CHICAGO, Sept. 13.—Sales of copper are in fair volume and the price is holding. Demand for tin and lead is small and prices are lower. The old metal market is dull and without feature.

Prices, per lb., in carload lots: Lake copper, 13.35c.; tin, 64.50c.; lead, 6.10c.; zinc, 6.35c.; in less-than-carload lots, antimony, 13.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 13.25c.; all being dealers' prices for less-than-carload lots.

FABRICATED STRUCTURAL STEEL

Awards Total About 30,000 Tons—New Projects Reported Only 15,000 Tons

Structural steel awards for the week totaled about 30,000 tons, of which 4800 tons is for a viaduct in Newark, N. J., and 2500 tons is for a gas holder at Hopewell, Va. The new work out for bids totals less than 15,000 tons. Awards follow:

NEW YORK, NEW HAVEN & HARTFORD RAILROAD, 165 tons, bridge at Rye, N. Y., to Phoenix Bridge Co.

PENNSYLVANIA RAILROAD, 190 tons, bridge at Lancaster, Pa., to Fort Pitt Bridge Co.

PENNSYLVANIA RAILROAD, 210 tons, bridge at Martin's Ferry, Ohio, to Bethlehem Steel Co.

CHICAGO, 190 tons, building for Illinois Bell Telephone Co., to Wendnagel & Co., local.

HOUSTON, TEX., 400 tons, bank building, to Houston Structural Steel Co.

DUBUQUE, IOWA, 200 tons, building for International Harvester Co., to Rock Island Bridge Co., Rock Island, Ill.

MONTREAL, 110 tons of Junior beams, for Dominion Bridge & Iron Co., to Jones & Laughlin Steel Corporation.

KEENE, N. H., 100 tons, normal school gymnasium, to New England Structural Co.

BOSTON, 150 tons, Mathew Cummings School, to Boston Structural Steel Co., Inc.

PROVIDENCE, R. I., 1200 tons, Loew's Theater, to New England Structural Co.

STAFFORD SPRINGS, CONN., 100 tons, bank, to G. Haarmann & Co., Holyoke, Mass.

NEW YORK, 16,400 tons reported to the Structural Steel Board of Trade; 5200 tons in the following jobs not previously reported: Colonial Bank at 416 West Forty-second Street and St. Joseph's Hospital at Paterson, N. J., to Harris Structural Steel Co.; cattle pens at Thirty-ninth Street and Twelfth Avenue, Craig Theater on West Fifty-third Street and column cores for building at 202 East Forty-fourth Street, to Levering & Garrigues Co.; 22-story hotel at 143 East Twenty-third Street, 16-story office building at 67 West Forty-seventh Street and Keith Theater in Flushing, to Taylor-Fichter Steel Construction Co.; telephone building at Long Beach, to Eidlitz & Ross; alteration to theater at Woodside, factory building at 441 Eleventh Street, Brooklyn, and chapel at Spuyten Duyvil and 242nd Street, to George A. Just Co.; parochial school at Scarsdale, N. Y., to Hay Foundry & Iron Works; office building at 321-325 West Forty-fourth Street and office building on Debevoise Place, Brooklyn, to Hedden Iron Construction Co.; Church of the Immaculate Conception on Staten Island, paint shop at Jamaica, bakery at Newark and Central Railroad of New Jersey station at Perth Amboy, to McClintic-Marshall Co.; 15-story apartment building at 44-50 East Seventy-second Street, to Paterson Bridge Co.

NEW YORK, 1450 tons, apartment building on Lexington Avenue between Eighty-eighth and Eighty-ninth Streets, to Easton Structural Steel Co.

NEW YORK, 1200 tons, municipal pier, to Jones & Laughlin Steel Corporation.

GLENWOOD, N. Y., 650 tons, building for Long Island Light & Power Co., to Lehigh Structural Steel Co.

SCHENECTADY, N. Y., 250 tons, building for General Electric Co., to American Bridge Co.

STATE OF NEW YORK, 500 tons, highway bridges, to several fabricators.

ERIE COUNTY, N. Y., 400 tons for rebuilding State bridges, from John W. Cowper Co., general contractor, to McClintic-Marshall Co.

NEWARK, N. J., 4800 tons, highway viaduct, to Phoenix Bridge Co.

ERIE RAILROAD, 125 tons, bridge, to McClintic-Marshall Co.

READING RAILROAD, 300 tons, bridge, to American Bridge Co.

READING RAILROAD, 150 tons, bridge, to Bethlehem Steel Co.

EDDYSTONE, PA., 1500 tons, office building for Baldwin Locomotive Works, to American Bridge Co.

HARRISBURG, PA., 1000 tons, Soldiers' and Sailors' Memorial Bridge, second section, to Bethlehem Steel Co.

CHARLESTON & WEST VIRGINIA RAILROAD, 200 tons, bridge, to Virginia Bridge & Iron Co.

TENNESSEE, 950 tons, building for American Bemberg Corporation, to Virginia Bridge & Iron Co.

COLUMBUS, GA., 325 tons, foundry building, to an unnamed fabricator.

HOPEWELL, VA., 2500 tons, one 1,500,000-cu. ft. gas holder and one 2,000,000-cu. ft. gas holder, to Stacey Mfg. Co.

MANSFIELD, OHIO, 250 tons, factory building, Mansfield Tire & Rubber Co., to Jones & Laughlin Steel Corporation.

PONTIAC, MICH., 120 tons of Junior beams, building for Fisher Body Co., to Jones & Laughlin Steel Corporation.

PITTSBURGH, 1100 tons, Millvale Avenue bridge, to Independent Bridge Co., Pittsburgh.

PITTSBURGH, 500 tons, lock gates for Dams Nos. 51 and 53, Ohio River, to Independent Bridge Co.

PITTSBURGH, 725 tons, May Drug Co. warehouse, to American Bridge Co.

ST. PAUL, MINN., 350 tons, building for Sears, Roebuck & Co., to McClintic-Marshall Co.

GLENDALE, CAL., 600 tons, office building, Grand Boulevard and Broadway, to Union Iron Works of Los Angeles.

FRESNO, CAL., 200 tons, steel poles and towers for San Joaquin Light & Power Co., to Pacific Coast Steel Co., San Francisco.

LOS ANGELES, 200 tons, galvanized structural steel for the city, to Minneapolis Steel & Machinery Co.

SAN FRANCISCO, 120 tons, addition to Medical Building, to Western Iron Works, local.

SAN FRANCISCO, 185 tons, sheds for Southern Pacific Co., at Fourth and Channal Streets, to Judson Mfg. Co., local.

SOUTH SAN FRANCISCO, 600 tons, mill building for Pacific Coast Steel Co., to be fabricated by the company.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

WALPOLE, MASS., 100 tons, high school.

NEW YORK, 175 tons, apartment building on Lexington Avenue.

NEW YORK, 2000 tons, addition to Velodrome Stadium.

NEW YORK, 1000 tons, apartment building for Bing & Bing on East Seventy-second Street.

NEW YORK, 450 tons, addition to grandstand for American League baseball team, Osborn Engineering Co., Cleveland, engineer.

NEW YORK STATE, 250 tons, highway bridges.

ATLANTIC CITY, N. J., 350 tons, Y. W. C. A. building.

CLEVELAND, 900 tons, theater for Midwest Properties Co.

SYRACUSE, N. Y., 425 tons, high school building.

ALBANY, N. Y., 200 tons, building for Grasselli Chemical Co.

YORK, PA., 500 tons, mill building for Sandusky Cement Co., Sandusky, Ohio.

RICHMOND, VA., 200 tons, medical college addition.

MICHIGAN CENTRAL RAILROAD, 112 tons for two bridges.

CINCINNATI, 800 tons, building for American Druggists Fire Insurance Association.

LOUISVILLE, 500 tons, plant extension for Henry Vogt Machine Co.

LOUISVILLE, 1000 tons, tobacco warehouse for Brown & Williams Co.

TENNESSEE, 3000 tons, three highway bridges for Tennessee State Highway Commission.

MODESTO, CAL., 150 tons, transmission towers for the Modesto Irrigation District, Pacific Coast Steel Co., San Francisco, low bidder.

SAN FRANCISCO, 800 tons, boxing arena, Post and Steiner Streets, Minneapolis Steel & Machinery Co., low bidder.

SAN FRANCISCO, 1000 tons, auditorium.

PASADENA, CAL., 800 tons, bank building.

Chairmen of Steel Treaters' Technical Sessions at Detroit

The American Society for Steel Treating has announced the chairmen and vice-chairmen of the various technical sessions to be held during the annual convention at Detroit, the week of Sept. 19 coincident with the celebration of national metal week and with the holding of the national metal exposition. They are as follows:

Monday morning, Sept. 19, Heat Treatment Session, chairman, J. L. McCloud, Ford Motor Co., Detroit; vice-chairman, E. J. Hergenroether, Cadillac Motor Car Co., Detroit. Monday afternoon, Testing Session, chairman, Prof. H. F. Moore, University of Illinois, Urbana, Ill.; vice-chairman, R. R. Moore, Wright Field, Dayton, Ohio. Tuesday morning, Sept. 20, Iron and Steel Session, chairman, Radclyffe Furness, Midvale Co., Nicetown, Philadelphia; vice-chairman, M. H. Schmid, Central Alloy Steel Corporation, Massillon, Ohio. Tuesday afternoon, Tool Steel Session, chairman, Dr. John A. Mathews, Crucible Steel Co. of America, New York; vice-chairman, B. F. Shepherd, Ingersoll-Rand Co., Phillipsburg, N. J. Wednesday morning, Sept. 21, Annual Meeting, chairman, J. F. Harper, Allis-Chalmers Mfg. Co., Milwaukee; Campbell Memorial Lecture Session, chairman, Prof. Alfred H. White, University of Michigan, Ann Arbor, Mich. Thursday morning, Sept. 22, Metallography Session, chairman, F. P. Gilligan, Henry Souther Engineering Co., Hartford; vice-chairman, Miss F. H. Clark, Western Union Telegraph Co., New York. Thursday afternoon, Chromium and Nickel Alloys Session, chairman, H. M. Boylston, Case School of Applied Science, Cleveland; vice-chairman, H. J. French, Bureau of Standards, Washington. Friday morning, Sept. 23, Forging Session, chairman, R. M. Bird of George F. Pettinos, Philadelphia; vice-chairman, J. A. Succop, Heppenstall Forge & Knife Co., Pittsburgh. Friday afternoon, Spring Steel and Hardness Testing Session, chairman, W. H. Phillips, Molybdenum Corporation of America, Pittsburgh; vice-chairman, H. M German, Universal Steel Co., Bridgeville, Pa.

REINFORCING STEEL

Awards Total 5000 Tons and New Jobs Up for Bids Are Nearly 8200 Tons

A considerable number of concrete reinforcing steel contracts, mostly under 500 tons each, make a total of about 5000 tons awarded in the past week. New projects under negotiations total close to 8200 tons, of which 2500 tons is for a viaduct in Cincinnati. Awards follow:

CHICAGO, 100 tons of rail steel, Auburn Park Hospital, to Joseph T. Ryerson & Son.

BOSTON, 200 tons, Studebaker sales and service station to Kalmon Steel Co.

BOSTON, 120 tons, office building on Newbury Street to an unnamed company.

BOSTON, 260 tons, Firestone Tire & Rubber Co. warehouse, to Concrete Steel Co.

NEW YORK, 130 tons, Fordham Hospital and Flushing Hospital, to Carroll-McCreary Co., Inc.

UNION COUNTY, N. J., 200 tons, road work, to Igoe Brothers.

JOWNSTOWN, PA., 450 tons, city highway bridges, to Carlem Engineering Co., Pittsburgh.

PITTSBURGH, 100 tons, for Park Mansions, to Carlem Engineering Co.

PITTSBURGH, 100 tons, Liberty Bridge, to Carlem Engineering Co.

CINCINNATI, 350 tons, garage, to West Virginia Rail Co.

CHICAGO, 790 tons, *Chicago Evening Post* building, to Inland Steel Co.

CHICAGO, 180 tons, office building for DePaul University, to Inland Steel Co.

CHICAGO, 500 tons of rail steel, apartment building at 4300 North Sheridan Rd., to Calumet Steel Co.

CLEVELAND, 150 tons, canal road work for Cleveland Union Terminals Co.; general contract awarded to Hunkin Conkey Construction Co.

STATE OF WISCONSIN, 260 tons, building for a public utility company, to American System of Reinforcing.

HINE, MO., 450 tons, settling basin for St. Louis municipal waterworks, to Laclede Steel Co.

OLYMPIA, WASH., 136 tons, paving work on State road No. 9, to an unnamed firm.

BELMONT, CAL., 130 tons, Notre Dame College, to an unnamed San Francisco jobber.

OAKLAND, CAL., 300 tons, building for the Mutual Stores, Inc., to an unnamed San Francisco jobber.

SAN FRANCIECO, 120 tons, apartment building, Jones and Washington Streets, to an unnamed local jobber.

Reinforcing Bars Pending

BOSTON, 300 tons, garage on Gainsboro Street.

NEW YORK, 150 tons, subway repair shops at 207th Street for New York Board of Transportation; bids Sept. 26.

NEW YORK, tonnage being estimated, barracks at Mitchell Field, L. I., and at Fort Wadsworth, S. I.; bids Sept. 23.

ELIZABETHPORT AND PERTH AMBOY, N. J., 500 tons, highway approaches to Staten Island bridges; both sides.

BUFFALO, 150 tons, O. J. Glenn Co. warehouse; bids being taken.

CINCINNATI, 2500 tons, Eighth Street viaduct.

CHICAGO, 140 tons, Woodlawn Hospital; D. G. Wallace, architect.

CHICAGO, 130 tons, Zizook apartment building; T. R. Bishop, architect.

WAUKEGAN, ILL., 124 tons, hotel; Oldsest & Williams, architects.

OAK PARK, ILL., 130 tons, high school field house.

CLEVELAND, 1800 tons for Cleveland Union Terminals Co.

CLEVELAND, 1200 tons for Eagle Avenue bridge.

CLEVELAND, 600 tons for Broadway bridge.

TOLEDO, OHIO, 300 tons, Toledo Hospital.

Railroad Equipment

The Erie has ordered 15 locomotive tenders from the Baldwin Locomotive Works.

The Reading has ordered five steel baggage-mail cars from the American Car & Foundry Co.

The Virginia Coal & Coke Co. has ordered 400 mine cars from the American Car & Foundry Co.

The Pittsburgh Coal Co. has placed an order for 200 mine cars with the Lorain Steel Co.

The Chicago & North Western has ordered two coaches from the Pullman Car & Mfg. Corporation.

PERSONAL

Elliott A. Allen has been appointed resident manager of the new branch engineering office at 1812 Van Ness Avenue, San Francisco, recently opened by the New Departure Mfg. Co., Bristol, Conn. He was graduated from the Worcester Polytechnic Institute in 1911 and has worked continuously with anti-friction bearings since that time.

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Saunders Norvell has been elected president of the Remington Arms Co., Inc., New York, and all its subsidiaries, succeeding John B. Smiley, who has resigned on account of ill health. Mr. Norvell has been identified with the hardware business during the greater part of his business life. He worked in the various departments of the Simmons Hardware Co. and was later vice-president and general manager of sales. He was instrumental in the organization of the Norvell-Shapleigh Hardware Co. and became its president. After a period of partial retirement he re-entered business as chairman of McKesson & Robbins, Inc., drug manufacturers and wholesalers. During his association with this company he has kept in constant touch with the hardware trade and has been a regular contributor to *Hardware Age*.

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M. L. Bardach, formerly president of the Bardach Iron & Steel Co., Norfolk, Va., has been appointed sales manager of the steam railroad department of the Columbia Machine Works & Malleable Iron Co., 255 Chestnut Street, Brooklyn, manufacturer of railroad supplies and equipment.

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F. William Cox has been appointed president and treasurer of the Cox & Sons Co., Bridgeton, N. J., manufacturer of pipe cutting and threading machinery, succeeding the late Charles F. Cox. K. B. Cox has been named vice-president and assistant treasurer; I. B. Custer, secretary, and G. Milton Loper, assistant secretary.

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Oliver J. Abell, of O. J. Abell & Co., 9 South Clinton Street, Chicago, sailed from San Francisco on Sept. 15 for Australia. Mr. Abell has recently connected himself with the General Motors Export Co. and will be in charge of a department of the production work of the seven General Motors plants in Australasia.

Dr. Karl Huber, of the engineering department of the well-known Witkowitz steel works in Czechoslovakia, is in the United States for a stay of two months. He will visit a number of steel plants in the Central West and later will extend his trip to the Pacific Coast.

—

Thomas W. Kennedy, president Mystic Iron Works, Boston, has returned from a trip to Europe.

—

Ray Cheney, formerly associated with E. Arthur Tutein, Inc., and subsequently superintendent of the H. & B. Foundry Co., Pawtucket, R. I., is now with the Vermont Snath Co., Springfield, Vt.

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E. Arthur Tutein, president of E. Arthur Tutein, Inc., Boston, has returned from a trip to Europe.

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Robert L. Eltringham has been appointed representative in northern California for the Dayton-Dowd Co., Quincy, Ill., maker of centrifugal pumps, and will have his headquarters in the Pacific Gas & Electric Building, San Francisco. W. L. Vansant and Stuart Goldsborough, Farmers Bank Building, Pittsburgh, have been named to represent the company in the Pittsburgh district.

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Charles F. Gold, for many years attached to the Buffalo office, Jones & Laughlin Steel Corporation, Pittsburgh, lately as assistant district sales manager, has been named district sales manager, succeeding Ledlie Laughlin, who recently resigned.

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Philip L. Smith, who has had the management of the ore and metal departments of H. Hollesen, Inc., 17 Battery Place, New York, has taken over this business under the name of Philip L. Smith, Inc. He will have the agency in the United States for the N. V. Metaalassociatie of Rotterdam, Holland.

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Robert C. Good, recently chief metallurgist of the Columbia Steel Co., Butler, Pa., has become associated with the service department of the Electro Metallurgical Sales Corporation, 30 East Forty-second Street, New York. He was graduated from Lehigh University as a metallurgical engineer in 1921. He will be located in the Oliver Building, Pittsburgh, as a metallurgist associated with R. S. Poister, to assist in carrying out the company's established policy of extending metallurgical service to its customers using ferroalloys.

Two American Research Directors Added to Steel Treaters' Honorary Membership

W. R. WHITNEY

CHARLES FRANCIS KETTERING of the General Motors Research Laboratory at Dayton, Ohio, and Willis Rodney Whitney of the General Electric Research Laboratory at Schenectady, N. Y., two of America's most distinguished scientists and research men, have been added to the already illustrious list of honorary members of the American Society for Steel Treating. Doctor Kettering's direction of the General Motors Research Laboratory has been largely responsible for the success of the General Motors Co.; while Doctor Whitney, as head of the General Electric Research Laboratory, has offered to the world many far-reaching and scientific contributions.

Both of these leaders will be present at the annual banquet of the Society at the Hotel Statler, Detroit, on Thursday evening, Sept. 22, to accept their certificates of election to honorary membership. This then will place them on the honor roll of the society which includes: Sir Robert Hadfield of London; Dr. Albert Sauveur of Harvard University; Dr. John A. Mathews, Crucible Steel Co. of America; Henri Le Chatelier of Paris; Prof. Kotaro Honda, Sendai, Japan; Dr. Charles F. Brush of Cleveland; Charles M. Schwab, Bethlehem Steel Corporation; and the late Elwood Haynes, Dr. E. D. Campbell and Judge Elbert H. Gary.

C. F. KETTERING

OBITUARY

HARRY WILLIAMS GODDARD, formerly president and treasurer of the Spencer Wire Co., Worcester, Mass., and for many years a foremost figure among the independent wire manufacturers of the United States, died at his home in Worcester, Sept. 8, aged 63 years. He was born in Holyoke, Mass., Sept. 14, 1863, the son of Dorrance Goddard and grandson of Benjamin Goddard, who was Ichabod Washburn's partner in 1831 in establishing this country's first wire mill at Worcester. This was the beginning of the plants of the Washburn & Moen Mfg. Co., now the Worcester works of the American Steel & Wire Co.

HARRY W. GODDARD

Harry Goddard went to work in Ichabod Washburn's South Worcester mill, now Central works of the American Steel & Wire Co., when he was 14 years old, serving as scale-boy, oiler, wheeler, night watchman and general helper. Two years later he stopped work to study a year at Wilbraham Academy, and was 17 years old when he entered the employ of Richard Sugden, in his wire mill in Wire Village, Spencer, Mass., as bookkeeper. But he soon became the handy man of the establishment. He attended to the correspondence, drove the team which delivered wire and hauled supplies, and, when another hand was needed in the mill, labored at the blocks, in the annealing house or in the packing room. His pay was $300 a year. Mr. Goddard used to tell how the stern regime asserted itself in later years, even on his wedding day, for a press of business compelled him to labor until 6.30 p. m., when he ate and dressed for his wedding in great haste and appeared at his bride's home at 7.30. Next morning he was at the mill again at 6.30.

When Mr. Goddard attained his majority he was made superintendent of the plant, with 75 men under him. In 1885 he became secretary of the corporation. Upon the death of Mr. Sugden, Mr. Goddard, then 32 years old, purchased with borrowed money the control of the business. Under his ownership it grew rapidly. Additional facilities were required and he built the nucleus of the Worcester plant. This was expanded rapidly. Finally, in 1920, Mr. Goddard reluctantly agreed to the merging of the business in the Wickwire-Spencer Steel Corporation, which combined the independent mills of central Massachusetts. Mr. Goddard had other manufacturing interests from time to time. Among them was the Springfield Drop Forging Co., of which he was president for 10 years.

Mr. Goddard was formerly president of Worcester Chamber of Commerce, and was a trustee of Worcester Art Museum and vice-president and trustee of the Worcester Home for Aged Men, whose fine building stands as his gift in memory of his father. His wife survives him and one daughter, the wife of Fred Harold Daniels, president and general manager of the Riley Stoker Co.

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HORACE A. BEALE, JR., president Parkersburg Iron Co., Parkersburg, W. Va., died at his home in that city on Sept. 6, aged 57 years. He attended the Hill School, Pottstown, Pa., and Haverford College, Haverford, Pa., and entered the steel business as a chemist in the plant of the Pennsylvania Steel Co., Steelton, Pa. Later he was employed in the puddling mill operated by his father at Parkersburg and shortly afterward was elected vice-president of the company. He became president after the death of his father in 1900. He was a member of the American Iron and Steel Institute and was prominently identified with civic activities at Parkersburg.

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MORRIS BRADFORD GREGG, vice-president of the National Lead Co., New York, died at the Polyclinic Hospital in that city on Sept. 6, following a short illness. He was 70 years of age, and had been identified with the National company at various times in his life, the last association dating back to 1908 when the Heath & Milligan Mfg. Co. was acquired by the National organization and Mr. Gregg was placed in charge of that department. He was prominently identified with the development of the manufacture of titanium oxide and brown barytes, in the production of which the Lead company is an important factor.

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JOHN T. KELLY, one of the founders and head of the Kelly & Jones Co., Greensburg, Pa., until its sale to the Walworth Co., Boston, in 1925, died at Scarsdale, N. Y., Sept. 5. He was born in Pittsburgh 74 years ago.

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ROBERT FORSYTH, for the last thirty years consulting engineer in connection with the design, construction and operation of iron and steel works, died at his home in Chicago on Sept. 11, following an illness of two months. He was born at Troy, N. Y., Sept. 28, 1849, and was graduated from the Rensselaer Polytechnic Institute in that city in 1869. He entered the industry as a student and draftsman at the Bessemer works, Troy, under the tutelage of Alexander L. Holley, and in 1872 became superintendent of the Bessemer department of the North Chicago Rolling Mill. In 1884 he was made superintendent of the Spang Steel & Iron Co., Pittsburgh, but left that company the following year to become manager of the Union Steel Co., Chicago. In 1889 he was made chief engineer and second vice-president of the Illinois Steel Co., holding that position until 1896, when he opened an office in the Rookery, Chicago, as a consulting engineer in the metallurgy of iron and steel and the appraisal of plants and properties. Mr. Forsyth was a member of the (British) Iron and Steel Institute, the American Iron and Steel Institute, the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining and Metallurgical Engineers, the Western Society of Engineers and of numerous clubs in Chicago, New York, Pittsburgh and Troy.

ROBERT FORSYTH

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SOREN PETER RINGER, general manager and designing engineer Walden-Worcester Co., Worcester, Mass., died suddenly on Sept. 7. He was born in Horsens, Denmark, and came to America 11 years ago. He went to Worcester in 1925, and was well known as an inventor in the United States and Europe, having been decorated for his services by King Oscar of Sweden and by the King of Denmark.

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FRANK ELLSWORTH LAMSON, vice-president Sessions Foundry Co., Bristol, Conn., died suddenly at his home in that city on Sept. 8, aged 66 years.

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WILLIAM F. HICKEY, associated with the Boston office of the Carnegie Steel Co. for nearly 30 years, died on Sept. 8, following an operation. He was born in Roxbury, Boston, 52 years ago.

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HERBERT E. JENNISON, president of the Jennison Co., dealer in wholesale and retail plumbers' supplies; owner and manager of the Blake Pump Co. and of the Thompson Co., all of Fitchburg, Mass., died at his home in that city on Sept. 8, aged 67 years.

British Market Shows Improvement

Rebates To Domestic Users in Effect—International Competition For Foreign Markets Brings Out Low Prices

(*By Cable*)

LONDON, ENGLAND, Sept. 12.

CLEVELAND pig iron sales since Sept. 1, have been the largest for some months. Stocks are diminishing and demand is absorbing current output. Some producers are contemplating blowing in additional furnaces. Other districts, however, are quiet and in Scotland four blast furnaces have been banked. Hematite is more active and 11 Northeast Coast hematite furnaces are in blast with demand exceeding production. Makers, however, are hesitant to increase output because of the unremunerative prices at present. Foreign ore continues quiet with British users, but the Continent is displaying more activity.

There is increased domestic demand for finished iron and steel following the steel makers' rebate offer, but export tonnage is still only 24,160 tons of pig iron for August, none of which went to the United States. The total iron and steel exports were 342,400 tons.

Tinplate is very quiet both with domestic and export consumers. Buying is only of small lots for immediate needs. Galvanized sheets are quiet.

Rollers of Japanese thin gage sheets are well sold for several weeks, but merchant sales for early shipment are reported to be only fair.

Continental iron and steel markets are quiet and British users of semi-finished material are disinterested. Export buyers of finished material are limiting purchases and makers are somewhat apprehensive of the British rebate scheme plan, now in effect.

GERMAN ACTIVITY AT PEAK

No Reduction of Steel Tariff Expected—Exports Quiet and Weaker

BERLIN, GERMANY, Aug. 24.—Evidence continues to accumulate that the intense activity of the steel industry, which has prevailed for most of this year, has about reached the peak and may be on the decline. Business in heavy products has grown quieter in the domestic field and export has declined and prices weakened. Much of the unusual activity of the German steel industry was the result of heavy domestic demand from the construction industries, but lately building requirements have been smaller and some of the general manufacturers, such as the textile mills, report a considerably smaller volume of orders. However, the electric equipment manufacturers and producers of railroad materials report continued improvement, and unemployment is still declining with only about 453,000 persons drawing unemployment pay and 180,000 drawing crisis allowances.

The trade press criticizes the efforts of American steel mills to have the anti-dumping act applied on imports of German steel, pointing out that identical measures should be taken against imports from France and Belgium, if any action is taken against Germany.

The proposed reduction of industrial import duties will not affect the system of bounties to exporting manufacturers. It is explained that the Federal Economic Council, which is to make a report on the proposed reductions in duties, is proceeding on the basis that reductions in the tariff should be made only on such items as were increased after the war and not on all industrial duties in the 1902 tariff. As the duties on iron and steel have not been increased since the war, no reduction of this schedule is expected. Consequently no change in Germany's position in the international steel market should occur. Manufacturers, it is pointed out, have materially benefited from these bounties on products for export, as is shown by statistics of increased export of machine tools, particularly to the United Kingdom.

The pig iron market is quiet and the scrap market is almost totally inactive, with heavy melting steel about the only grade in demand. Lately, iron ore imports have increased, with a total of 4,307,000 metric tons in the second quarter of this year, compared with 3,755,000 tons in the first quarter. Of the total iron ore re-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.86 per £ as follows:

Durham coke, del'd.	£0	18½s.				$4.50		
Bilbao Rubio ore†	1	1	to £1	1¼s.		5.10	to	$5.16
Cleveland No. 1 fdy.	3	10				17.01*		
Cleveland No. 3 fdy.	3	7½				16.40*		
Cleveland No. 4 fdy.	3	6½				16.16*		
Cleveland No. 4 forge	3	6				16.04*		
Cleveland basic (nom)	3	15	to 3	15½		18.23	to	18.35
East Coast mixed	3	14	to 3	15		17.98	to	18.23
East Coast hematite	3	14½	to 3	15½		18.10	to	18.35
Rails, 60 lb. and up	7	15	to 8	0		37.67	to	38.88
Billets	6	0	to 6	10		29.16	to	31.59
Ferromanganese	12	0				58.32		
Ferromanganese (export)	10	15	to 11	0		52.25	to	53.46
Sheet and tin plate bars, Welsh	5	11½	to 5	15		27.09	to	27.95
Tin plate, base box	0	18⅜	to 0	18⅝		4.42	to	4.45
Black sheets, Japanese specifications	13	15	to 14	0		66.83	to	68.04
						C. per Lb		
Ship plates	7	12½	to 8	2½		1.65	to	1.76
Boiler plates	10	10	to 11	0		2.28	to	2.39
Tees	8	2½	to 8	12½		1.76	to	1.87
Channels	7	7½	to 7	17½		1.60	to	1.70
Beams	7	2½	to 7	12½		1.55	to	1.65
Round bars, ¾ to 3 in.	7	12½	to 8	2½		1.65	to	1.76
Steel hoops	10	10	to 11	0		2.28	to	2.39
Black sheets, 24 gage	10	0	to 10	5		2.17	to	2.22
Galv. sheets, 24 gage	13	17½	to 14	0		3.01	to	3.03
Cold rolled steel strip, 20 gage, nom.	14	0	to 14	5		3.03	to	3.09

*Export price, 2½s. less for 500 tons or more.
†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron.(a)								
Belgium	£3	0s.	to £3	0½s.	$14.58	to	$14.70	
France	3	0	to 3	0½	14.58	to	14.70	
Luxemburg	3	0	to 3	0½	14.58	to	14.70	
Basic pig iron:								
Belgium	2	18	to 2	19	14.09	to	14.34	
France	2	18	to 2	19	14.09	to	14.34	
Luxemburg	2	18	to 2	19	14.09	to	14.34	
Coke	0	18			4.37			
Billets:								
Belgium	4	5	to 4	6	20.66	to	20.90	
France	4	5	to 4	6	20.66	to	20.90	
Merchant bars:					C. per Lb.			
Belgium	4	13	to 4	14	1.03	to	1.04	
France	4	13	to 4	14	1.03	to	1.04	
Luxemburg	4	13	to 4	14	1.03	to	1.04	
Joists (beams):								
Belgium	4	12	to 4	13	1.02	to	1.03	
France	4	12	to 4	13	1.02	to	1.03	
Luxemburg	4	12	to 4	13	1.02	to	1.03	
Angles:								
Belgium	4	13	to 4	14	1.03	to	1.04	
⅛-in. plates:								
Belgium (a)	6	5	to 6	6	1.38	to	1.39	
Germany (a)	6	5	to 6	6	1.38	to	1.39	
⅜-in. ship plates:								
Belgium	6	1	to 6	2	1.33	to	1.34	
Luxemburg	6	1	to 6	2	1.33	to	1.34	
Sheets, heavy:								
Belgium	6	1			1.33			
Germany	6	1			1.33			

(a) Nominal

ceived in the second quarter, 2,095,000 tons came from Sweden. Imports of Spanish ore, however, have increased four-fold in the past year.

The July production figures were considerably in excess of the same month of 1926. Output of pig iron was 1,108,893 tons compared with 767,871 tons in July of last year; of steel ingots, 1,361,785 tons compared with 1,019,338 tons a year ago and of rolled products, 1,049,539 tons compared with 864,203 tons in July last year.

Domestic pig iron and steel prices have continued unchanged except for the pig iron syndicate's reduction of 8 m. ($1.90) per ton on No. 3 foundry and 4 m. (95c.) on Luxemburg No. 3 foundry. This action was taken as a measure against the outside producer, the Maximilianhuette, which rejected the proffered quota for joining the syndicate. It was also to offset the recent 5s. ($1.21) per ton reduction by the British on No. 3 foundry. British and French competition for pig iron business has lately been increasingly keen.

In July the export of steel bars was larger, but domestic activity continued unchanged. Domestic demand for bands is heavy, but export buying is small. The heavy sheet market is quieter, but the thinner gages are showing more activity. Tube mills are quiet.

Solingen cutlery makers report satisfactory conditions, although July is usually the beginning of a period of inactivity. The machinery manufacturers complain of unprofitable prices. The agricultural machinery builders are still depressed, but improvement is expected as a result of this year's favorable crops. The machine-tool and textile machinery manufacturers are still booking a fair volume of orders and manufacturers of paper mill and printing machinery report satisfactory conditions.

Severe Wire Competition in Prospect

HAMBURG, GERMANY, Aug. 29. — The Continental wire market, especially the German, has been considerably stirred by an alleged communication to the wire association from the leading American interest. It is claimed that this interest has informed the European wire association that, unless the increasing activity of outsiders, in quoting prices as much as 10 per cent below the association schedule in Central American markets, is controlled, a price war may ensue. This would be directed against the association, which includes German, Belgian, Dutch and Czechoslovakian mills.

An agreement between the association and outsiders seems most unlikely at present, especially as the largest mill, a Belgian company, Cloterie et Trefilerie de la Paix, is said to have refused to accept its allotment in the association.

Poland Not Yet in Cartel — Steel Union Officials Resign

BERLIN, GERMANY, Aug. 24.—At present there seems to be very little prospect of Poland's entering the International Steel Cartel. Reports of negotiations between the German Pig Iron Syndicate and the Franco-Belgian-Luxemburg Pig Iron Entente for creation of an international pig iron cartel are denied.

Differences of opinion have resulted in the resignation from the board of control of the Vereinigte Stahlwerke A. G. of Wiener Carp, and Fentener van Vlissingen. The former is president of the board of control of the Phoenix A. G. and the latter is a prominent Dutch financier. The differences which resulted in the resignations are said to be the foundation of the Stahlwerk Niederrhein of Düsseldorf, in which both these officials of the Vereinigte Stahlwerke A. G. participated.

The primary reason for the establishment of this rival to the Vereinigte Stahlwerke A. G. seems to have been a desire of Dutch consumers to insure an independent supply of tubes for the Dutch oil corporations. The new organization, however, seems to be regarded as a threat both to the Vereinigte Stahlwerke A. G. and the Mannesmann Tube Corporation.

JAPAN BUYS TIN PLATE

Usual Oil Company Requirements in Market—Army Makes Annual Purchase

NEW YORK, Sept. 13.—Export to the Far East is limited to a few large purchases by outstanding Japanese consumers. The Chinese market is quiet. Among recent inquiries from Japan was about 60,000 base boxes of oil can tin plate for the Nippon Oil Co., bids on which were opened Sept. 12. On the previous purchase by the Nippon Oil Co., about 27,500 base boxes are said to have gone to British makers and in the past two weeks the remaining 27,500 base boxes have been placed by the exporter with the three leading American makers. The tin plate for the Japanese Army, about 14,500 base boxes, has been placed by a Japanese export house with a large independent mill in this country. The gas pipe for the Tokio Gas Co., more than 1,000,000 ft., was placed with two American mills, about 60 per cent with the leading interest and about 40 per cent with a large independent producer.

Importers of steel in New York continue inactive, except for a small volume of spot sales of structural material, which is sold while in transit or upon arrival at the dock. There are reports of some sizable tonnages of reinforcing bars under inquiry, but the prospective purchasers are offering such low prices that importers do not regard the business seriously. One such inquiry is described as a contract for about 7000 tons of reinforcing bars, half open hearth and half Thomas or Bessemer grade for delivery over the period of a year or more. There seems to be little expectation that the order will be placed. Current quotations on imported bars and shapes are about 1.65c. per lb., c.i.f. duty paid, for plain steel bars of Thomas grade; about 1.55c. per lb., c.i.f., for structural material, Thomas grade; 1.70c. per lb., c.i.f., for open-hearth bars and about 1.80c. per lb. for open-hearth reinforcing bars.

European Mills Seek Chinese Trade

HAMBURG, GERMANY, Aug. 29.—An active struggle for Chinese trade seems to be developing among European steel producing countries. A French syndicate of producers, which includes the Societe Anonyme D'Ougree-Marihaye, has secured the entire order for 51,000 tons of rails for the Chinese Eastern Railroad. The contract calls for deliveries during 1928.

The lowest quotation, that of the French syndicate, is reported as $42.38 per ton, c.i.f., with a German company, Siemens-Schuckert Werke, quoting $42.43 per ton. An interesting feature of the bids was the fact that for the first time since the war Russia appeared in competition for the business. The South Russian Steel Corporation quoted $51.70 per ton, the highest bid made.

It is believed that the European Rail Makers Association will investigate the prices submitted, on the score that all members under the agreement of the association should quote uniform prices. In addition other large rail orders from the Far East have recently been booked by French mills at the lowest prices of any submitted.

German rail mills which are members of the European Rail Makers Association are planning intensive cultivation of foreign markets. As the prices which members of the association may quote must be uniform, there will be an effort to prove superior quality. Results of tests under operating conditions will be made public as well as description of heat treatment methods, analysis of the steel and other features.

Shipments of electric industrial trucks and tractors in August were reported by the Department of Commerce at 91, compared with 90 in July and with 97 in August, 1926. For domestic use shipments in August included three tractors and 86 of other types, while two units were for export. In eight months there were 93 tractors and 705 other types for domestic use and 78 for export. This compares with 126 tractors and 767 of other types for domestic use in the first eight months of 1926, together with 52 for export.

Exhibitors and Products to be Shown at Machine Tool Exposition

(Continued from page 701)

head and 6-station indexing table); No. 25 hydraulic 4-spindle cylinder boring machine. In attendance: William Baker, H. L. Tigges, G. E. Hallenbeck, W. W. Elliott.

Badger Tool Co., Beloit, Wis.

No. 221 Badger grinder, automatic double spindle type; No. 8 Badger grinder, with hydraulically operated face grinding table; Badger grinding disks, cylinder wheel chucks, accessories. In attendance: John Nielsen, E. B. Gardner, R. D. Gardner.

W. F. & John Barnes Co., Rockford, Ill.

Two-spindle diamond boring machine for diamond boring connecting rods; two-spindle diamond boring machine for diamond boring cross holes in pistons; horizontal duplex drilling machine with oil gear feed; No. 300 production drill with silent chain motor drive. In attendance: John S. Barnes, V. A. Root, Fred G. Vosler.

Barnes Drill Co., Rockford, Ill.

No. 214 multiple cylinder honing machine with hydraulically reciprocated spindles, all-geared, self-oiling, all ball-bearing; No. 249 self-oiling, all-geared honing machine with Timken roller bearings and eight quick changes of speed. No. 266 self-oiling, all-geared, all ball-bearing drill and tapper with sliding head; No. 240 self-oiling, all-geared, all ball-bearing drill with hydraulic control; No. 242 self-oiling, all-geared drill with Timken roller bearings. In attendance: J. E. Andress, A. G. Block, A. M. Johnson, W. M. Fairbairn, R. M. Andress, M. C. Hogard, W. G. Nichol.

John Bath & Co., Inc., Worcester, Mass.

Ground thread taps, ground thread gages, internal micrometers, master reference rings, ground thread rolling dies. In attendance: John Bath, J. Chester Bath, R. E. Lamb, S. W. Bath.

THE IRON AGE IN BOOTH NO. 810

THE IRON AGE editorial and advertising representatives will be found in booth No. 810 at the National Machine Tool Exposition. Current issues of the paper and reprints of this section of the Sept. 15 issue will be available.

Charles H. Besly & Co., Chicago.

No. 6—20-in.—I wet motor driven Besly grinder, No. 49—53-in.—wet Besly grinding machine, No. 161—30-in.—L Besly grinder, No. 141—20-in.—L Besly grinder, No. 309—30-in.—motor driven vertical spindle Besly grinder, Besly Titan abrasive disks, Besly taps. In attendance: Edward P. Welles, L. R. Capes, Charles H. Munch, L. E. Jacobs, C. A. Knill, George Klemp, John F. Curns, William H. Allen, Murdock Campbell, Ralph W. Young, John Miller, Jr., F. G. Lane, Edward Powers.

Blanchard Machine Co., Cambridge, Mass.

Blanchard automatic surface grinder No. 16-A, Blanchard washing attachment, Blanchard reaming machine. In attendance: H. K. Spencer, H. F. Skillings, H. C. Donovan, F. E. Bartley, W. B. Blakeman, W. H. Cannon.

J. G. Blount Co., Everett, Mass.

Motor driven grinders and motor driven buffing machines. In attendance: J. G. Blount, Jr., F. G. Koppenburg, H. N. Blount.

Bowen Products Corporation, Auburn, N. Y.

Bowen system of lubrication, a centralized system for lubricating machine tools. In attendance: W. S. Meeks, H. A. Keith, George W. Severson, W. O. Wright, C. A. Bacon, F. H. Gleason.

Bradford Machine Tool Co., Cincinnati.

Bradford "all geared" universal toolroom lathe with motor drive—with universal relieving, coarse screw cutting, taper turning, draw-in collet and with quick change feeding and threading arrangements and oil pump and pan; Bradford unit type drill heads and tapping heads. In attendance: Samuel S. Williams, Charles J. Smith, S. C. Watson.

Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.

Ninety-six-in. type, No. 94 heavy-duty face grinder, motor driven, equipped with 42-in. steel chuck; sectional grinding wheel; No. 186 floor grinder. In attendance: H. H. Peck, I. L. Burritt, F. C. Penny, H. E. Smith.

Brown & Sharpe Mfg. Co., Providence, R. I.

No. 5 heavy plain milling machine, No. 33 automatic milling machine, No. 21 automatic milling machine, No. OY plain milling machine, No. 34 gear hobbing machine, No. 13 automatic gear cutting machine, No. 13 universal and tool grinding machine with circular forming tool grinding equipment, No. 2 universal grinding machine, No. 2 surface grinding machine with high-speed surface grinding attachment, No. 4 automatic screw machine, No. 2 automatic screw machine, high-speed, (for motor drive only) fitted with vertical slide; No. OOG automatic screw threading machine, high speed, (for motor drive); No. OOG automatic screw machine, high speed, (for motor drive only) fitted with burring attachment; cutters and hobs, machinists' small tools, No. 3 universal milling machine. In attendance: J. G. Swinburne, C. A. Ballou, T. M. Conte, J. H. Devlin, J. M. Paterson, R. Rowbottom, J. H. Skelton, W. F. Smith, W. Spencer, E. S. Thurston, J. A. Wagner, J. A. Waterman, J. Yates.

Bryant Chucking Grinder Co., Springfield, Vt.

No. 12 Bryant motor-driven internal grinder; No. 3 Bryant internal grinder grinding small cam rolls; No. 3 Bryant internal grinder grinding ball-bearing rings; display of samples ground on Bryant machines; display of airplane motor parts ground on Bryant machines. In attendance: W. L. Bryant, J. B. Johnson, L. C. Gilchrist, R. O. Perry.

Buckeye Portable Tool Co., Dayton, Ohio.

A complete line of pneumatic drills, grinders, reamers, sanders, nut setters, screw drivers, etc., built with the perfected rotary principle and embodying other distinctive features. In attendance: W. W. Price, W. R. Gummere, H. O. Gummere, C. F. Overy, C. Humphrey.

Buhr Machine Tool Co., Ann Arbor, Mich.

Multi-head automatic drill press, automatic, multiple index fixture, multiple spindle drilling and tapping heads—adjustable and fixed center; Buhr tap chucks—both friction and positive drive. In attendance: Glenn D. Evans, William H. Nicholls, William Blades, Joseph F. Buhr.

Bullard Machine Tool Co., Bridgeport, Conn.

Ten-in. six-spindle Contin-U-Matic center lathe, 6-in. four-spindle Mult-Au-Matic, standard vertical turret lathe. In attendance: E. P. Bullard, J. W. C. Bullard, E. G. Bullard, E. P. Blanchard, J. W. Bray, John Tillman, W. A. Connor, F. A. Thompson, R. H. Newman, F. E. Hatch.

Carlton Machine Tool Co., Cincinnati.

Three-ft. Carlton heavy-duty radial drilling machine arranged for adjustable speed motor on arm; 5-ft. Carlton heavy-duty radial drilling machine arranged for adjustable speed motor on arm. In attendance: Jack C. Carlton.

Chicago Belting Co., Chicago.

Leather belt running in water; short center drive demonstrating models; operating exhibit of belt shop with actual belt making; rolls of belting; mechanical leather specialties; charts, photos, etc. In attendance: J. R. Hopkins, Floyd Hance, A. J. Weis, C. A. Ball.

Chicago Pipethread Machine Co., Racine, Wis.

Power pipe and bolt threading machines. In attendance: L. H. Taylor, R. T. Ingalls, Charles Rasmussen, W. J. Oberlein.

Cincinnati Bickford Tool Co., Cincinnati.

6 ft. Super Service, roller bearing, 36 speeds in head, plain radial drilling machine with constant speed motor on arm drive; 3 ft. Super Service, roller bearing, 36 speeds in head, plain radial drilling machine with constant speed motor on arm drive; 21-in. Super Service, cone type, sliding head upright drill with tapping attachment and constant speed motor drive; 20-in. Super Service production drill (sliding saddle type) with tapping attachment and constant speed motor drive. In attendance: A. H. Tuechter, G. E. Schauer, L. D. Quackenbush, G. P. Gradolf, R. L. Rickwood, D. C. Klausmeyer, R. M. Husband, N. C. Schauer, S. K. Wallace.

Cincinnati Electrical Tool Co., Cincinnati.

Products shown in the booth of the R. K. Le Blond Co.

Cincinnati Grinders, Inc., Cincinnati.

Cincinnati Lathe & Tool Co., Cincinnati.

16-in. Cincinnati geared-head lathe, motor drive, with pan, pump, taper, also draw-in attachment, etc., on tool room work; 24-in. x 10-ft. Cincinnati geared-head lathe, motor drive, arranged for general manufacturing and other heavy duty work. In attendance: William C. Heindel, W. J. Anderson.

Cincinnati Milling Machine Co., Cincinnati.

No. 4 vertical miller, No. 1-M plain miller, 48-in. duplex automatic miller, 48-in. plain automatic miller, 12 x 72-in. plain self-contained grinder, 12 x 16-in. plunge cut grinder, No. 2 centerless grinder. In attendance: F. A. Geier, F. V. Geier, Walter Tangeman, F. B. Heitkamp, C. F. Roby, S. Einstein, R. Harrison, George Binns, P. O. Geier, John Caster, Walter Stegner, F. M. Angevin, L. Nenninger.

Cincinnati Shaper Co., Cincinnati.

24-in. heavy duty Cincinnati rapid traverse shaper, motor drive; Cincinnati universal shaper; single and double screw shaper vises; Cincinnati gear burnisher. In attendance: P. G. March, Jr., R. T. Hazelton, H. S. Robinson, George Diehl, T. H. Schebrat, Frank T. Goetz.

Cisco Machine Tool Co., Cincinnati.

4-ft. Cisco radial drill, 18-in. x 8-ft. Cisco ball bearing spindle lathe, Cisco ¼-in. multi-tap, Cisco polishing machine. In attendance: H. C. Busch, R. B. Busch, H. P. Kienker, J. G. Schaffner.

Cleveland Automatic Machine Co., Cleveland.

5½-in. chucking machine; 2-in. model M with special hobbing attachment; ½-in model M. In attendance: A. L. Garford, H. W. Ripple, H. M. Rich, Herbert E. Nunn, Bart C. Young, A. W. Schafer, William Moran, G. N. Samstag, C. W. Cowdrey.

Cleveland Planer Co., Cleveland.

Cleveland open side planer. In attendance: E. L. Essley, E. P. Essley, L. H. Mesker, J. Jenne.

Cleveland Punch & Shear Works Co., Cleveland.

Double crank power press, inclinable power press, punch press, toggle press, combination punching and shearing machine, small tools, such as punches, dies, rivet sets, chisel blanks, markers, coupling nuts, pistons. In attendance: W. D. Sayle, W. C. Sayle, H. C. Sayle, R. J. Pardee, A. L. Bechtel, H. J. Corrin, R. E. Graves, C. W. Hancock, H. J. Warren, R. S. Howell, W. C. Wright, D. L. Larimer, W. J. Stewart, H. R. Smith, S. Miller.

Clipper Belt Lacer Co., Grand Rapids, Mich.

Clipper belt lacers, fasteners or hooks, cutters with safety feature, connecting pins, Clipper ship, electrically-operated. In attendance: Earl H. Forsyth.

Cochrane-Bly Co., Rochester, N. Y.

No. 66 metal sawing machine, No. 11 automatic saw sharpening machine, No. 21 semi-automatic high speed cut-off saw, No. 14 Duplex shaper-miller, No. 1 filing machine, No. 2 filing machine. In attendance: W. H. Welch, T. M. Crandall, Chester Jacobs.

Colonial Tool Co. and Michigan Tool Co., Detroit.

Milling cutters, hobs, gear cutters, metal cutting tools, plain broaches, spline broaches, gages, automatic broach pullers. In attendance: Otto Lundell, E. H. Kurtz, T. R. Oleck, H. W. Reynolds, C. J. Halborg, E. H. Kurtz, T. A. Oleck.

Columbia Machine Tool Co., Hamilton, Ohio.

Columbia 16-in. superior heavy duty, back-geared crank shaper, new design, motor driven; Columbia 36-in. superior heavy duty, back-geared crank shaper, new design.

Commercial Tool Co., Cleveland.

Sensitive high speed drill presses (Demco), universal grinder (Grand Rapids) adjustable thread snap gages, plug thread gages, internal micrometers, internal thread micrometers, ground thread taps, air cylinders and chucks, cylindrical plug gages, plain limit snap gages, plain ring gages, taper gages, lead testing devices, angle testing devices, gage blocks, optical flats, toolmakers' flats, thread measuring wires, dial gages, helical reamers, helical end mills, ground gear hobs, ground thread hobs, milling cutters, gear testing devices, cutter testing devices, adjustable blade reamers, cylinder reamers, round broaches, square broaches, spline broaches, tapping devices, quick change chucks, amplifying gages external, amplifying gages internal, special gages, physical laboratory equipment. In attendance: L. K. Goss, H. E. Henry, W. L. Warrander, John Salzer, L. Borooz, H. I. Findling, Leo Young.

Consolidated Machine Tool Corporation of America, Rochester, N. Y.

Betts-Bridgeford ball-bearing geared-head lathe, Newton milling machine, Colburn heavy duty boring mill. In attendance: A. H. Ingle, Alfred Trosch, W. O. Ingle, R. G. Holmes, H. L. Boecler, F. A. Campbell, A. W. Van Buren, C. R. Williams.

Cushman Chuck Co., Hartford, Conn.

Lathe chucks, face plate jaws, boring mill jaws. In attendance: H. E. Sloan, H. W. Hultgren.

Diamond Machine Co., Providence, R. I.

Diamond oil-drive face grinding machine; Diamond oil-drive surface grinding machine with universal grinding head. In attendance: A. A. Wood, D. K. Bartlett, G. F. Huxford, Luther H. Burrill, Morris Slepkow.

Dreses Machine Tool Co., Cincinnati.

3-ft. multi-duty ball bearing radial drill with constant speed motor drive arranged on end of arm. In attendance: Charles E. Gilbert, J. E. Spaeth.

Eastern Machine Screw Corporation, New Haven, Conn.

Complete line of H & G die heads, chasers, chaser grinder, threading machine (Webster-Perk 2-spindle threader demonstrating H & G die heads.) In attendance: C. W. Bettcher, O. E. Hoelzel, H. F. Wieler, J. E. Jennings, B. DePolo, A. E. Chadwick, G. E. Mager, F. J. O'Rourke.

Ex-Cell-O Tool & Mfg. Co., Detroit.

Ex-Cell-O high speed internal grinder spindles in motion; demonstration of the precision of fitting of XLO high speed ball bearings, parts and sectioned models of XLO internal grinder spindles; samples of work done with XLO high speed internal grinder spindles; Ex-Cell-O standard drill jig bushings; jigs equipped with XLO standard bushings. In attendance: N. A. Woodworth, Philip Huber, C. R. Alden, F. D. Sicklesteel, William F. Wise, J. R. Haycock, M. B. Montgomery.

Fairbanks, Morse & Co., Chicago.

Sectionalized squirrel cage and double squirrel cage motors; a new inclosed ventilated motor; a squirrel cage motor; 32-in. shaper operated by double squirrel cage motor; a meter showing the horsepower consumed by each cut. In attendance: G. T. Aitken, E. Chambers, R. J. Roy, R. L. Johnson, G. J. Podlesax, E. J. Hay, Glen H. Corlette, R. M. Kinney, C. B. Stibolt.

Farrel Foundry & Machine Co., Buffalo.

Sykes gear generators cutting straight tooth; Sykes continuous tooth herringbone gears and Sykes gear tooth comparator. In attendance: A. G. Kessler, W. E. Sykes, Austin Kuhns, J. F. Leahy, Paul A. Manger, H. Kitchen, T. Holloway, H. Temporal, John Brandt, D. Watt.

Fellows Gear Shaper Co., Springfield, Vt.

71A type high-speed gear shaper with scroll type chuck set-up for finishing shank-type transmission gear; 75 type gear shaper set up for finishing helical automobile engine timer gears; 7-type high-speed gear shaper equipped with side-trimming attachment for side-trimming automobile transmission clutch gears; 7-type high-speed gear shaper with special trimming mechanism adapted to both the generation of involute and non-involute shapes; 6A type gear shaper for cutting both internal and external gears, capacity 18-in. P.D., 5-in. face; a new thread generator set up for generating automobile steering gear worms; gear burnishing machine for finishing gears after final cutting and prior to hardening, a new product; the Red Liner, for automatic gear inspection, a machine which graphically records errors in gears magnified 200 times, a new product; involute testing machine, a highly refined device for inspecting gear shaper cutters and other involute shapes. In attendance: E. R. Fellows, E. J. Fullam, E. W. Miller, W. F. Slomer, E. Stubbs, Douglas T. Hamilton, J. B. Strong, C. A. Bennett, C. J. Nagel, C. C. Bankes.

Foote-Burt Co., Cleveland.

Multi-cut vertical broaching machine, single spindle automatic nut tapping machine, two-way semi-automatic drilling machine, No. 15½-F, 6-spindle drilling machine, No. 22½ high duty drilling machine; No. 1¼ Sipp sensitive drilling machine, No. BW-23, 2-spindle Sipp sensitive drilling machine, No. DE-1 single spindle Sipp sensitive drilling machine. In attendance: G. E. Randles, T. H. Dean, Jr., W. F. Babcock, Herbert Kennedy, David F. Noble, R. E. Delameter.

Fosdick Machine Tool Co., Cincinnati.

6-ft. Fosdick economic radial drill, 100 per cent centralized control, head power traverse, pipe tap leads, all gears run in oil, all change gears of sliding type, purolator oil filter; 25-in. Fosdick heavy duty upright drill, power feed, quick return, automatic trip and depth gage, sliding head, elevating table, oil pump and piping; 13-in. Fosdick No. 2 superspeed sensitive drill, two-spindle pedestal type, quick speed change, elevating table, sliding head; 3/16-in. Fosdick superspeed friction tapper; 16-in. Fosdick No. 4 sensitive drill, single-spindle pedestal type, power feed, quick return, quick speed change, sliding head, elevating table, oil pump and piping; 16-in. Fosdick No. 5 sensitive drill, two-spindle pedestal type, power feed, quick speed change, sliding head, elevating table, oil pump and piping; ½-in. Fosdick friction tapper. In attendance: N. B. Chase, W. C. DeRoo, H. L. Fehrman.

Foster Machine Co., Elkhart, Ind.

No. 5 Foster geared head universal turret lathe in operation; 3-B Foster universal turret lathe equipped with 18-in. 3-jaw; Foster-Barker hydraulic chuck in operation. In attendance: W. H. Foster, H. A. Moore, Carl Moser.

Gairing Tool Co., Detroit.

Counterbores, core drills, backspot facers and reamers. In attendance: E. Gairing, B. O'Meara, J. K. Murdock, G. J. Landry, William G. Harvey, E. T. Gropler, H. P. Boggis, C. B. Cole, J. W. Mull, Jr., D. J. Normoyle.

Gardner Machine Co., Beloit, Wis.

No. 89 hydraulic surface grinder, No. 7½ disk grinder equipped with mechanically oscillating work tables. In attendance: F. E. Gardner, W. B. Leishman, B. H. Pratt, E. M. Risler, H. C. Steinbuck, W. L. Townsend, H. W. Knopke.

Gallmeyer & Livingston Co., Grand Rapids, Mich.

Grand Rapids universal cutter and tool grinders (five sizes); Grand Rapids automatic surface grinder; Grand Rapids drill grinders (five sizes); Grand Rapids tap grinder; Grand Rapids combination twist drill and tap grinder. (All machines with self-contained motor drive). In attendance: Christian Gallmeyer, S. Owen Livingston, William H. Gallmeyer, B. C. Saunders, C. H. Gallmeyer, J. DeKoning.

General Electric Co., Schenectady, N. Y.

Motors and control. In attendance: T. H. Reeves.

Geometric Tool Co., New Haven, Conn.

Geometric self-opening dies and collapsing taps including the following tools which will be in actual operation; style KH standard die head, a new tool never shown before,

on a Warner & Swasey screw machine; two style KD rotary self-opening die heads on a Grand double end threading machine; a style KD rotary self-opening die head and a Class S collapsing tap on a geometric double spindle threading machine. In attendance: James W. Sneyd, G. A. Denison, P. A. Pritchard, J. M. Dillon, Frank Heilman, G. J. Hawkey.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

No. 45 high power precision horizontal boring, drilling and milling machine; No. 11 fully automatic internal grinder (Teromatic); No. 9 double unit, fully automatic internal grinder (Teromatic). In attendance: H. B. Kraut, C. Gebuhr, G. A. Pabst, A. E. Ulrich, R. H. McCormick, K. F. Gallimore, F. J. Glassel, A. E. Hintermeyer, W. J. Porter.

Gisholt Machine Co., Madison, Wis.

Geared head turret lathes, automatic chucking machines, balancing machines, small tools. In attendance: A. R. Engler, W. J. Hannum; F. M. Long, E. S. Chapman, L. E. Godfriaux, C. B. Carr, George M. Class, W. I. Senger, W. L. Libby, G. E. Thomas, R. D. Heflin, H. G. Hall, R. E. McCartney, J. H. Nebel, A. W. Sidell, E. J. Conohan, C. J. Baxter, A. E. Lynch, J. S. Wright.

Gits Brothers Mfg. Co., Chicago.

Oil cuts, oil hole covers, sight feed oilers, wick oilers, lubricators. In attendance: R. J. Gits, Frank Zemean, O. T. Morgan.

Gleason Works, Rochester, N. Y.

Sixty-in. spiral bevel planing generator, 12-in. two-tool straight bevel gear generator, 12-in. spiral bevel cutter grinder, 8-in. manufacturing straight bevel gear generator, 10-in. manufacturing spiral, 18-in. bevel gear testing machine, generator tool grinder, spacing tester; also, spiral bevel gears, spiral bevel motor reduction unit, hypoid gear rear axle. In attendance: S. H. Earl, A. L. Stewart, F. E. McMullen, B. H. Bickle.

Goddard & Goddard Co., Detroit.

Production milling cutters for all kinds of milling; cutters for railroad work. In attendance: C. H. Wallace, H. P. Boggis, E. E. Toerner, E. E. Guntert, William Fritz.

Goss & DeLeeuw Machine Co., New Britain, Conn.

Multiple spindle chucking machine, single threading, equipped with air chucks; multiple spindle chucking machine, double threading. In attendance: Stanley T. Goss, S. B. Martin, J. J. Spring, E. H. Peck.

Gould & Eberhardt, Irvington, N. J.

Thirty-two-in. invincible shaper; 16HS manufacturing hobbing machine. In attendance: F. L. Eberhardt, W. E. Zimmerman, H. W. Jacobson, G. E. Spies, F. G. Eberhardt, J. F. Duffy, J. Allwood, J. Craig.

Greenfield Tap & Die Corporation, Greenfield, Mass.

Hydroil internal heavy-duty grinder No. 28-C; universal cutter and reamer grinder, motor driven; snap gages, plain and thread; pipe thread gages, reamers, plain plug and ring gages, taps, dies, twist drills, pipe tools, thread plug and ring gages, screw slotting cutters. In attendance: R. B. Hubbell, Louis Battey, E. J. Bryant, A. M. Drake, A. J. Kiehne, G. W. Demarest, C. H. Miller.

Greenlee Brothers & Co., Rockford, Ill.

Four-spindle 1¼ x 6-in. automatic screw machine, a new product operating parts of automatic screw machine; adjustable multiple spindle hydraulic feed drilling machine, a new product; multiple spindle drill head. In attendance: A. H. Eggers, J. H. Mansfield.

Hall Planetary Co., Philadelphia.

Thread milling machines. In attendance: H. Schaeffer, L. Goss, P. Hall.

Hammond Mfg. Co., Cleveland.

Radial drilling machine, pedestal type with automatic reversing head; cabinet base polishing lathe. In attendance: William D. Buss, Walter Osto.

Hanchett Swage Works, Big Rapids, Mich.

No. 584 Locomotive guide bar grinder and side surface. In attendance: A. K. Hanchett, L. B. Hanchett and F. K. Benedict of the Hanchett Swage Works; W. S. Paden, E. C. Filstrup and A. W. Filstrup of the Machinery Co. of America; George D. Miller representing William K. Stametz, Cleveland.

Hanson-Whitney Machine Co., Hartford, Conn.

Universal semi-automatic thread milling machine, universal vertical tool and die shaping machine; rapid precision centering machine; sharpening machine, taps, gages, hobs, thread rolling dies. In attendance: George McPherson, D. J. Normoyle, A. G. Brice, E. H. Huntington, J. W. Johnson, Robert Johnson, C. A. Lauridsen.

Heald Machine Co., Worcester, Mass.

New No. 72A-3 Size-Matic internal grinding machine; new No. 72 Duplex Size-Matic internal grinding machine; new No. 25A rotary surface grinding machine, extra large capacity; Heald magnetic chucks and demagnetizers. In attendance: S. T. Massey, R. M. Lippard, R. A. St. John, J. G. Wonn, R. W. Frye, W. F. Rogers, J. F. Pilum, M. F. McCormick, Oliver Johnson, F. H. Grimshaw.

Hendey Machine Co., Torrington, Conn.

32-in. crank shaper, 16-in. crank shaper, 20-in., 12-speed geared head lathe, 14-in. enclosed drive tool-room lathe, all motor driven. In attendance: A. H. Hall, E. Barker, C. P. Lieblein.

Higley Machine Co., South Norwalk, Conn.

8-in. swing carriage type Higley "Coldcut" sawing machine with stock handling tables. In attendance: L. M. Waite, I. S. Smith, Henry Smith.

Hobart Mfg. Co., Troy, Ohio.

Metal-cleaning machines and equipment. In attendance: E. C. Arndts.

Hoefer Mfg. Co., Freeport, Ill.

Auxiliary drilling heads, No. 3 piston driller, 5-hp. high production driller (first showing); No. 3 continuous driller (first showing). In attendance: Chester A. Hoefer, Paul Andree.

Hisey-Wolf Machine Co., Cincinnati.

Universal motor electric drills, slate and marble electric drills, bench drilling stands, double-end electric grinders, floor and bench type, double-end electric buffers, floor and bench type; combination grinder and buffer, floor and bench type; electric tool post grinders, electric external lathe grinders, combination electric external and internal lathe grinders, electric aerial grinder. In attendance: E. Ritz, Jr., W. J. Holtmeier, G. J. Hawkey, Cliff J. Henefelt.

Hyatt Roller Bearing Co., Newark, N. J.

Hyatt roller bearings for machine tools and line shaft drives. In attendance: W. W. Young, W. T. Long, L. F. Stuebe, F. S. Darke, W. L. Iliff, C. L. Newby, R. P. Sanborn, H. M. Carroll.

Hydraulic Press Mfg. Co., Mount Gilead, Ohio.

H-P-M Hi-Speed hydraulic press; H-P-M Hi-Pressure hydraulic radial pump, variable reversible delivery type. In attendance: Howard F. McMillin, Paul C. Pocock, C. E. Newell, W. Ernst, H. J. Miller, H. M. Conrad.

Ingersoll Milling Machine Co., Rockford, Ill.

Four-head adjustable rail, heavy pattern Ingersoll type milling machine, four-head adjustable rail, standard Ingersoll type milling machine, standard Ingersoll keyway milling machine, 24-in. Ingersoll face milling cutter grinder, and a large representative line of Ingersoll standard and special milling cutters. In attendance: J. M. B. Scheele, J. M. Macrae, F. J. Malone, R. M. Gaylord, E. I. Morgan, W. M. Grove, Percy Ott, H. C. Rose, W. Ingersoll, A. H. Lyon, G. L. Bradley, S. W. Fish, A. A. Braid, W. C. Sproul, J. R. Johnson.

International Machine Tool Co., Indianapolis, Ind.

Libby turret lathes. In attendance: O. B. Iles, D. J. Cosner, T. P. Dickinson, H. Heidergott, C. L. Libby, J. Villard, V. V. Caywood, E. H. Stine, G. H. Menzie, F. H. Robertson, A. Ruwe, R. Hunter.

Jones & Lamson Machine Co., Springfield, Vt.

Two Fay automatic lathes machining automobile side bevel gears; one 17-in. J & L flat turret lathe machining drop forged gear blank; one 2¼ x 24 J & L flat turret lathe machining typical bar job; one Hartness screw thread comparator with new type mounting fixture; Hartness automatic dies and flanders ground thread taps. In attendance: H. S. Beal, John Lovely, William Howard, C. H. Seaver, F. L. Watkins, J. L. Reilly, John C. Price, G. S. McClellan, George J. Keller.

Kearney & Trecker Corporation, Milwaukee.

Mil-Waukee-Mil Duplex, in operation, milling both ends of LeRoi Motor Co. crankshaft forgings; Mil-Waukee-Mil Simplex equipped with automatic indexing table, in operation, milling wrench jaws—5000 pieces will be completed during the show; Mil-Waukee-Mil Simplex, in operation, showing cutting capacity of the tool on large billets of steel; No. 2 standard universal Milwaukee milling machine on which will be mounted the new light Hi-Speed universal milling attachment. Machine will be in operation, showing versatility of this new milling machine and attachment for tool and die and general toolroom work. In attendance: E. J. Kearney, Theodore Trecker, J. B. Armitage, George L. Erwin, Jr., William K. Andrew, George E. Gustafson, Walter P. Lotz, F. G. Jackson, Carl L. Reasel, R. A. J. Wellington, R. W. Ott, M. J. Luther, M. J. Schmitt.

Keller Mechanical Engineering Corporation, Brooklyn.

Type BL-482 Keller automatic tool room machine with jig boring attachment, type R-6 Keller cutter and radius grinder, type BK-3 Keller flexible shaft machine with accessories, type BK-1 Keller Flexible shaft machines with high speed attachment and accessories. In attendance: J. F. Keller, S. A. Keller, Jules Dierckx, Charles Bitter, A. J. Benson, P. D. Brown, Henry Schreiber, P. C. Renno, D. Forrest Butler, G. I. Croll.

Kelly Reamer Co., Cleveland.

Adjustable boring and reaming tools including single-point, block type, adjustable two-blade and multiple-blade roughing and finishing and special production tools; also diamond boring tools. In attendance: E. W. Putnam, A. H. Howard, H. C. Putnam, M. C. Daw, F. S. Hartwell, W. H. Lund, H. Berg.

Kempsmith Mfg. Co., Milwaukee, Wis.

Plain milling machine. In attendance: R. J. Wilson, J.

Goetz, F. Wollaeger, L. Radermaker, A. Nieman, C. O. Watson, H. L. Livesay, H. E. Czerwonky.

Kent Machine Co., Cuyahoga Falls, Ohio.

Kent semi-automatic six spindle driller, Kent automatic stud threader, Kent semi-automatic two spindle pointing or chamfering machine. In attendance: Arthur S. Day.

King Machine Tool Co., Cincinnati.

42-in. heavy duty, new style vertical boring and turning machine, two heads on cross rail (right hand fixed turret —left hand swivel head with four way tool holder) and right hand vertical side head with four way tool holder. In attendance: E. A. Miller, C. F. Muller, I. Herbest.

Kingsbury Machine Co., Keene, N. H.

Automatic drilling and tapping heads and machines. In attendance: E. J. Kingsbury, Gunner Swahnberg.

W. B. Knight Machinery Co., St. Louis.

No. 4 Knight universal vertical miller, with high speed attachment, horizontal attachment, shaping attachment, index centers, circular milling table and verniers and scales for jig boring; also No. 1½ Knight universal vertical miller. In attendance: H. E. Knight, John M. Davis.

Landis Machine Co., Waynesboro, Pa.

¾-in. Landis double-head threading machine, motor driven; 6-in. Landis pipe threading and cutting off machine, motor driven; Landis automatic forming and threading machine, motor driven; Lanco heads for automatic and hand operated threading machines; Land-Matic heads for turret lathes and hand operated screw machines; Victor collapsible taps for internal threading; Victor receding chaser collapsible taps for internal threading. In attendance: C. N. Kirkpatrick, C. F. Meyer, S. W. Mathias, G. M. Stickell, J. W. Frey, J. E. Hovis, P. A. Reynolds.

Landis Tool Co., Waynesboro, Pa.

Plain hydraulic grinder, self-contained cutter and tool grinder, self-contained universal grinder, samples of work and parts. In attendance: R. F. Ingram, A. P. Steiner, J. E. Frantz, H. E. D. Gray, S. S. Shoemaker, F. Greiner, R. W. Burk, J. S. Baker, W. G. Nevin, G. M. Talheim, J. H. Hollinger, H. E. Streeter, R. E. Forthman, I. S. Deardorff, J. L. Welsh, W. H. Bearinger, J. C. Shindledecker, N. S. Talheim, R. O. Bearinger.

J. N. Lapointe Co., New London, Conn.

Hydraulic broaching machines, broaching tools and keyway sets. In attendance: Edward L. Streeter, Jr., Donald H. West, B. Hanson, Peter Collins, W. T. Bittner.

La Salle Tool Co., Ottawa, Ill.

No. 1 La Salle plain and surface grinder, motor driven; No. 2 La Salle automatic surface grinder, motor driven; American wet drill grinder, motor driven. In attendance: F. S. Knowles, J. C. Kopf.

R. K. LeBlond Machine Tool Co., Cincinnati.

LeBlond heavy duty automatic crankshaft lathe with center drive, LeBlond 16-in. new model geared head rapid production lathe, LeBlond No. 16 heavy duty automatic lathe, LeBlond No. 12 heavy duty multi-cut lathe, LeBlond universal tool room grinder, LeBlond 15-in. geared head precision tool room lathe. In attendance: H. C. Pierle, W. F. Greene, W. O. Strauss, R. E. LeBlond, B. N. Brockman.

Lees-Bradner Co., Cleveland.

Gear grinding machine, gear testing machine, gear hobbing machine, universal gear hobbing machine, thread milling machine, gear finishing machine. In attendance: E. J. Lees, C. H. Schurr, E. E. Blundell, J. G. Stout, E. A. Bayton, H. C. Young, J. Potter Cunningham, F. W. Sebelin, William Hadley.

Lehmann Machine Co., St. Louis.

22-24½-in. x 11-ft. bed Lehmann 16 speed geared-head engine lathe complete with standard equipment and with taper attachment and rapid traverse to carriage; lathe arranged for motor drive through belt and idler with motor mounted on headstock and controlled by remote control starter, push button start and stop. In attendance; Paul Lehmann, A. H. Lehmann.

Leland-Gifford Co., Worcester, Mass.

No. 1 12-in., 1-spindle, belted-spindle, bench-type ball bearing drilling machine; No. 1 12-in., 1-spindle, motor-spindle, bench-type ball bearing drilling machine; No. 1, 12-in., 2-spindle, belted-spindle floor type ball bearing drilling machine with No. 1 ball bearing tapping attachment; No. 2, 14-in., 1-spindle, motor-spindle ball bearing drilling machine with ball bearing back gear unit; No. 2, 14-in., 3-spindle, belted-spindle ball bearing drilling machine with semi-automatic power feed and No. 5 ball bearing tapping attachment; No. 3, 24-in., 1-spindle, motor-spindle ball bearing drilling machine with semi-automatic power feed and ball bearing back gear unit; No. 3, 24-in., 2-spindle, belted-spindle ball bearing drilling machine with semi-automatic power feed and ball bearing back gear unit and tapping attachment. In attendance: S. B. Dowd, H. P. Sawtell, A. H. Anderson, C. H. James, J. H. Hoover, E. A. Heidlinger, B. J. Riordan, W. J. Fors.

Lincoln Electric Co., Toledo, Ohio.

Polyphase induction motors, arc welders and examples of welded steel construction. In attendance: A. F. Davis, R. P. Tarbell, R. H. Pennock, O. P. Hanchette, H. P. Egan.

Link-Belt Co., Indianapolis.

Silent chain drives using the bushed-pin joint and the Link-Belt automatic idler, with illustrations of adaptation to main and secondary machine tool drives. In attendance: J. S. Watson, J. S. Holl, R. S. Dyson, P. V. Wheeler, F. H. Dalrymple, J. D. Walsh, E. H. Smedley.

Lodge & Shipley Machine Tool Co., Cincinnati.

3 x 6-ft. Duomatic lathe, 14-in. x 6-ft. selective head tool room lathe, 24-in. x 10-ft. selective head engine lathe. In attendance: J. Wallace Carrel, H. J. Breitenbach, Fred Albrecht, Fred Schoeffler, W. L. Dolle, Robert T. Johnston.

Logansport Machine Co., Logansport, Ind.

Logan air-operated chucks and other devices including arbor presses, chucks (collet, two and three-jaw), various types of rotating and non-rotating air cylinders, drilling and milling devices, automatic hand and foot control valves, air reducing valves, work ejecting valves and vises. In attendance: Frank G. Payson, John C. Cotner.

Lucas Machine Tool Co., Cleveland.

Motor driven No. 42 precision horizontal boring, drilling and milling machine; motor driven, 32-ton Lucas power forcing press. In attendance: F. P. Sprague, G. A. Yost, J. B. Green, J. A. Leighton, H. M. Lucas, Oskar Kylin, O. L. Chapman.

Machine Products Co., Cleveland.

Cut gears, splined shafts, clutches, sprockets, worms, worm wheels, gear boxes. In attendance: Earl H. Browning, Harrison Browning, Conrad Sandberg.

Madison-Kipp Corporation, Madison, Wis.

Force feed, fresh-oil, automatic centralized machine tool lubricators. In attendance: T. E. Coleman, J. A. Coleman, W. G. Coles, J. A. Courter, F. R. Clark, A. T. Lillegren.

McCroskey Tool Corporation, Meadville, Pa.

McCroskey Super adjustable reamers; McCroskey Wizard quick-change chucks and collets, including friction drive tapping collets; McCroskey turret tool post for engine lathes; McCroskey self-centering steadyrests; McCroskey Nevastop face plates for engine lathes. In attendance: F. P. Miller, R. W. Thomas, C. M. Sutton, Frank Walster, S. P. Miller, Lewis Skeel, W. J. Greenleaf, K. B. Spalding, Fred Fisher, A. J. Moore, I. C. Cameron, T. J. Fraser, W. R. Wyatt, Gus Sealander.

Michigan Tool Co., and Colonial Tool Co., Detroit.

Michigan Tool Co.: Milling cutters, hobs, gear cutters, metal cutting tools. Colonial Tool Co.: Plain broaches, spline broaches, gages, automatic broach pullers. In attendance: Otto Lundell, C. J. Halborg, E. H. Kurtz, T. A. Oleck, H. W. Reynolds.

Moline Tool Co., Moline, Ill.

No. 10 automatic multiple spindle lapping machine complete jigged and tooled, in operation; No. 115-D hydraulic feed drilling machine with 12 BV-16 heads; universal joint head showing driving and driven unit. In attendance: Louis Hallene, Russell Brandenburg, Wilson P. Hunt, E. C. Hunt, C. R. Rosborough, O. R. Reller, A. E. Lindberg, H. Fink, Willis C. Kuschmann, S. L. Brandenburg, F. Johnson, W. H. Guthrie, D. C. Eipper, F. Johnston, Clarence Hallene.

Monarch Machine Tool Co., Sidney, Ohio.

14-in. x 6-ft. helical geared ball-bearing tool-room lathe; 20-in. x 8-ft. helical geared ball-bearing lathe; 22-in. x 10-ft. helical geared ball-bearing lathe, double carriage automatic. In attendance: W. E. Whipp, F. C. Dull, J. A. Raterman, P. A. Abe, C. A. Bickel, Robert Bender.

Morton Mfg. Co., Muskegon Heights, Mich.

Morton 36-in. stroke heavy-duty, draw-cut railroad shaper, Morton 36-in. stroke heavy-duty draw-cut shaper, Morton finished machine keys and special shapes from cold drawn steel, Robinson automatic air hose couplings for pipe and hose lines, O. K. tools and holders as used with Morton draw-cut shapers. In attendance: Henry E. Morton, G. F. Goble, M. Frank Bliss.

Murchey Machine & Tool Co., Detroit.

Collapsing taps and self-opening die heads. In attendance: C. K. Chapin, A. J. Prance, W. C. Beechner, P. F. Zerkle, J. H. Coyle.

National Acme Co., Cleveland.

Nine-sixteenths-in. five-spindle Acme automatic screw machine, and 1⅜-in. four-spindle Gridley automatic screw machine, self opening dies. In attendance: A. E. Drissner, R. C. Kinley, A. E. Henn, W. G. Furlong, E. C. Lange, R. B. Miller, Jack Powers, A. P. Williams.

National Automatic Tool Co., Richmond, Ind.

Natco model C-13 multiple-spindle lead screw tapper-motor drive; Natco model C-13-H multiple-spindle hydraulic feed driller-motor drive; Natco No. 9 single-spindle Hi-duty driller-direct motor drive; Natco model S-f-H horizontal hydraulic feed duplex driller; Natco model C-110 horizontal hand feed duplex driller; complete dis-

play of Natco universal joints, showing various sizes and details of construction; complete display of Natco quick change tap and drill holders, showing different sizes with details of construction; set of photographs, showing numerous installations of Natco equipment. In attendance: E. D. Frank, G. W. Schepman, T. C. McDonald, G. E. Moote, C. H. Briggs, E. H. Flook, J. L. Finn.

National Machinery Co., Tiffin, Ohio.
In attendance: H. E. Lott, C. D. Harmon, W. H. Kildow, Jr.

New Britain Machine Tool Co., New Britain, Conn.
No. 23A New Britain four-spindle air controlled automatic chucking machine (tool rotating); No. 454 New Britain four-spindle new-matic chucking machine (work rotating); No. 172 1 x 5-in. New Britain six-spindle automatic screw machine. In attendance: H. H. Pease, Edward L. Steinle, G. K. Atkinson, James W. Barr, L. E. Jolls, J. J. Ritter, T. C. Stirling, F. Rau, J. J. Barry, S. Meyerjack, C. A. Perry.

New Departure Mfg. Co., Bristol, Conn.
A radial drill gearbox, a large heavy duty grinder spindle, a complete high-speed sensitive drilling machine, a high-speed internal grinding spindle, a vertical, self-lubricating spindle, a planer drive and loose pulley mounting. In attendance: T. C. D. Crow, H. W. Holdsworth, L. H. Gaylord, H. A. Gamelin.

Niagara Machine & Tool Works, Buffalo.
Niagara No. 68-B double crank power press, single geared frame of 4-piece tie rod construction, distance between uprights, 36 in., diameter of shaft in bearings, 5 in., approximately 88 tons pressure near bottom of stroke, arranged for belted motor drive, with self-adjusting ball bearing idler for belt; Niagara No. 7-A inclinable power press plain flywheel type, with single stroke attachment for clutch, approximately 50 tons pressure near bottom of stroke, arranged for belted motor drive with self-adjusting ball bearing idler for belt; Niagara No. 696 power gap squaring shear, nominal cutting length, 96 in., capacity No. 10 gage mild steel and lighter, with new style patented hold-down, having self-adjusting spring feet, arranged for belted motor drive, with self-adjusting ball bearing idler for belt. In attendance: Russell J. Caplin.

Niles Tool Works Co. (Division of Niles-Bement-Pond Co.), Hamilton, Ohio.

Norma Hoffman Bearings Corporation, Stamford, Conn.
Norma-Hoffman precision ball, roller, and thrust bearings; Norma minimeter, a precision measuring instrument; several models showing successful application of bearings in machine tools. In attendance: O. P. Wilson, D. E. Batesole, R. E. Hecker, C. D. Kilham, George R. Bott, Norman Bell, T. J. Harley, T. M. Kaino.

Norton Co., Grinding Machine Division, Worcester, Mass.
Norton grinding machines, 14 x 24 in. heavy-duty BA; type B-full automatic; type B-semi-automatic; 10 x 50 in. type A-semi-automatic cam grinder; No. 2 motor driven universal tool and cutter grinder; 36-in. type S; high speed snagging stand; also an exhibit of Norton grinding wheels, refractories and Norton floors. In attendance: W. L. C. Neilson, H. W. Dunbar, J. C. Spence, C. H. Norton, A. G. Beldon, W. T. Montague, H. J. Griffing, H. P. Chace, O. E. Nordstrom, C. H. Hill, H. L. Swainey, O. A. Knight, J. O. Hedlund, G. B. Taft, N. H. Hubbard, John Cook, M. E. Mattson, E. W. Hellstrom, A. R. Sandine.

Oakite Products, Inc., New York.
Educational exhibit on Oakite materials and methods used in plants for cleaning before plating, enameling, japanning, painting, etc.; temporary rust preventions; cleaning metal parts during process of manufacture; grinding, cutting, stamping and drawing operations. In attendance: Carl Johnson, F. A. Aston, W. H. Cook, P. A. Pinsoueautt, H. C. Duggan.

Oesterlein Machine Co., Cincinnati.
48-in. tilted offset miller, 40-in. Ohio tilted rotary, heavy model, No. 2 heavy Ohio universal milling machine, No. 2 motor driven grinder, 24-in. Aurora upright drill. In attendance: Charles D. Oesterlein, Charles Freudenthaler, Alfred H. Merschel.

Ohio Machine Tool Co., Kenton, Ohio.
Twenty-four-in. Ohio Dreadnaught shaper. In attendance: Charles C. Swift, John Seibold, Karl Sherman, S. K. Johns, C. J. Davis.

Oilgear Co., Milwaukee, Wis.
No. 3 oilgear hydraulic broaching machine; twin ten oilgear hydraulic broaching machine; 7½-hp. oilgear variable speed rotary transmission. In attendance: E. C. Wollaeger, Lester Kissel.

Oliver Instrument Co., Adrian, Mich.
No. 51 chuck head Oliver drillpointer, Oliver drill point thinning machine, type SP-2 Oliver die making machine, new Oliver ARC face mill grinder. In attendance: E. C. Oliver, R. J. Sack.

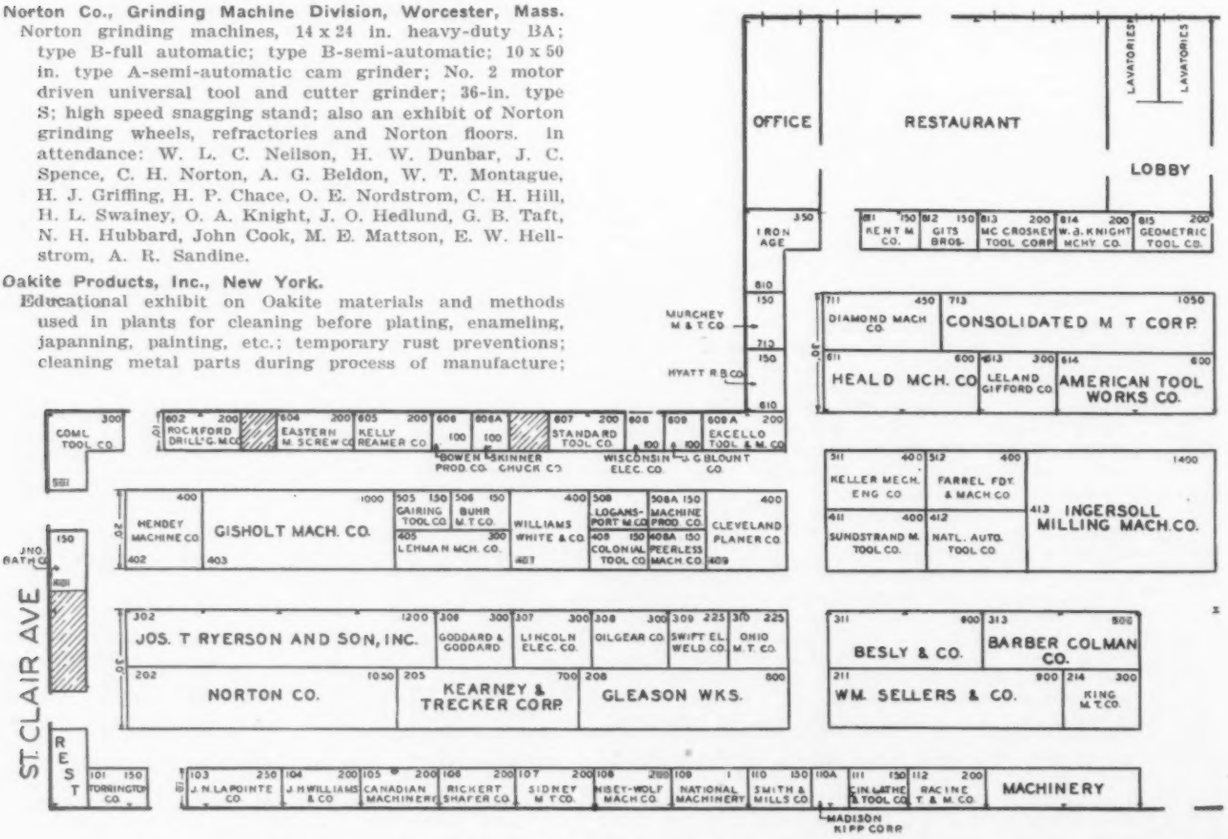
Oster Mfg. Co., Cleveland.
Die stocks, pipe cutters, pipe vises, portable stationary pipe threading machine. In attendance: A. S. Gould, L. S. Newman, C. D. Wood, Jr., Ralph J. Oster.

Peerless Machine Co., Racine, Wis.
Six-in. Peerless H. S. metal sawing machine, 6-in. H. S. universal sawing machine with motor in operation, 9-in. Peerless H. S. universal sawing machine with motor in operation. In attendance: A. H. Goetz, C. A. Schuman, Charles Rasmussen.

Porter-Cable Machine Co., Syracuse, N. Y.
Hi-Speed production lathe, belt grinder, disk sander and grinder, universal attachment for milling machines, Take-About portable sander, Kwicksaw (motored hand saw). In attendance: W. A. Ridings, A. N. Emmons, W. C. MacBain, Ward Gere, D. J. Ridings.

Pratt & Whitney Co., Hartford, Conn.
"B" lathes in 13, 16, and 20-in. sizes, jig borer, 6-in. vertical shaper, bench lathe, No. 3 bench miller, automatic lathe, small tools, milling cutters, taps, dies, etc., and gages. In attendance: C. R. Burt, W. P. Kirk, F. O. Hoagland, W. H. Miller, C. M. Pond, A. H. d'Arcambal, David Ayr, H. D. Tanner, E. C. Shultz.

Putnam Machine Co., Fitchburg, Mass.
Five-in. new design horizontal boring, drilling and milling machine of the table type; 36 x 36 x 12 ft. double housing



Arrangements of Exhibit Spaces in the Main Exposition Hall of the National Machine Tool

planer, reversing motor drive. In attendance: F. J. Baumis, C. A. Moore, Jr., E. M. Moore, J. Wainwright, A. C. Gough, E. L. Fickett, P. E. Arthur, W. O. Forman, C. A. Sayward, W. A. Deems, T. S. Stephens, O. L. Andrews, F. M. Maley.

Racine Tool & Machine Co., Racine, Wis.

Complete line of high-speed metal cutting machines; the new Racine shear-cut production saws; gravity feed and positive feed reciprocating saws; Racine duplex band saws for soft and hard metals; Racine abrasive metal cutters for hardened tool steels. In attendance: M. E. Erskine, J. M. Jones, E. R. Larson, P. F. Schatzman.

Ramsey Chain Co., Inc., Albany, N. Y.

Ramsey silent chain drives, Ramsey chains, sprockets, pinions. In attendance: Howard N. Davis, John J. Walsh.

Ransom Mfg. Co., Oshkosh, Wis.

Heavy electrical driven snagging grinding machines—No. 6 RW, No. 131 C, No. 123, No. 3 RW, No. 109; one pair 14-in. safety flanges; wheel dresser to fit 6 RW machine. In attendance: George P. Ransom, Roy L. Burdick, Frank W. Walsh, Homer P. Ransom.

Reed-Prentice Corporation, Worcester, Mass.

New 14-in. sliding geared-head Reed-Prentice lathe; new No. 5 Becker die sinking and vertical milling machine; No. 2 Becker high-speed ball bearing router and vertical miller; No. 1 Wolf portable link sawing machine. In attendance: F. W. McIntyre, R. C. Blackinton, A. W. Schneider.

Rickert-Shafer Co., Erie, Pa.

Automatic self-opening die-heads, collapsible taps, tapping machines, chaser-grinders, adjustable offset boring heads, R-S automatic single purpose threading and second operation machines. In attendance: George Shafer, A. A. Rickert, A. A. Shafer, C. W. Howard, J. W. Shea.

Rockford Drilling Machine Co., Rockford, Ill.

Drilling and boring machines, turning machine, spring testing machine, clutches. In attendance: E. C. Traner, W. W. Blomberg, J. J. Morris.

Rockford Machine Tool Co., Rockford, Ill.

Thirty-six-in. Rockford universal openside shaper-planer and 24-in. Rockford Hy-Service shaper. In attendance: Morris Monson and assistants.

Joseph T. Ryerson & Son, Inc., Chicago.

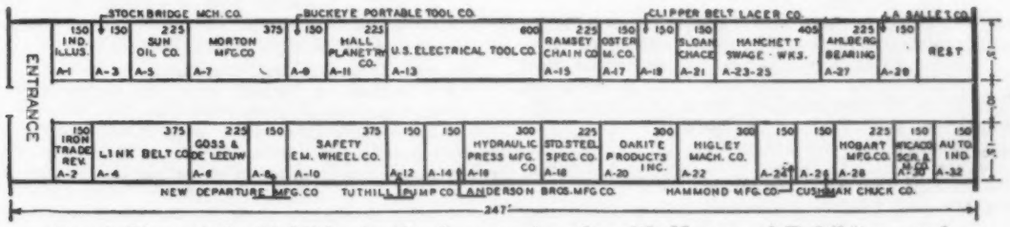
30 in. x 16 ft. Ryerson-Conradson geared-head engine lathe; Little General disk type sensitive drill; No. 10 Ryerson horizontal drilling machine; No. 0, No. 1, and No. 5 sizes Ryerson serpentine throatless shears; Ryerson combination punch and shear; No. 4 Ryerson-Kling punch, Ryerson high speed friction saws; No. 1 Ryerson-Glader nail machine. In attendance: A. G. Bryant, C. R. Gregg, A. P. Schumann, I. B. Yates, V. N. Towers, R. S. Armstrong, T. W. Delanty, F. J. Clark, R. C. Page, D. MacArthur, F. G. Grosse, G. H. Merriell, E. S. Pike, M. C. Fidgeon, R. H. Happersett, F. E. Hesse, E. A. Lynch, O. A. Bloomquist, J. M. Eckes, H. C. Kelsey M. H. Dixon, A. L. G. Gentles, E. L. Critchlow, B. A. Barnett, T. J. Bold, G. A. Francoeur, R. A. Davidson, E. N. Carlson, D. S. Mair, C. J. Harter, P. H. Peterson.

Safety Emery Wheel Co., Springfield, Ohio.

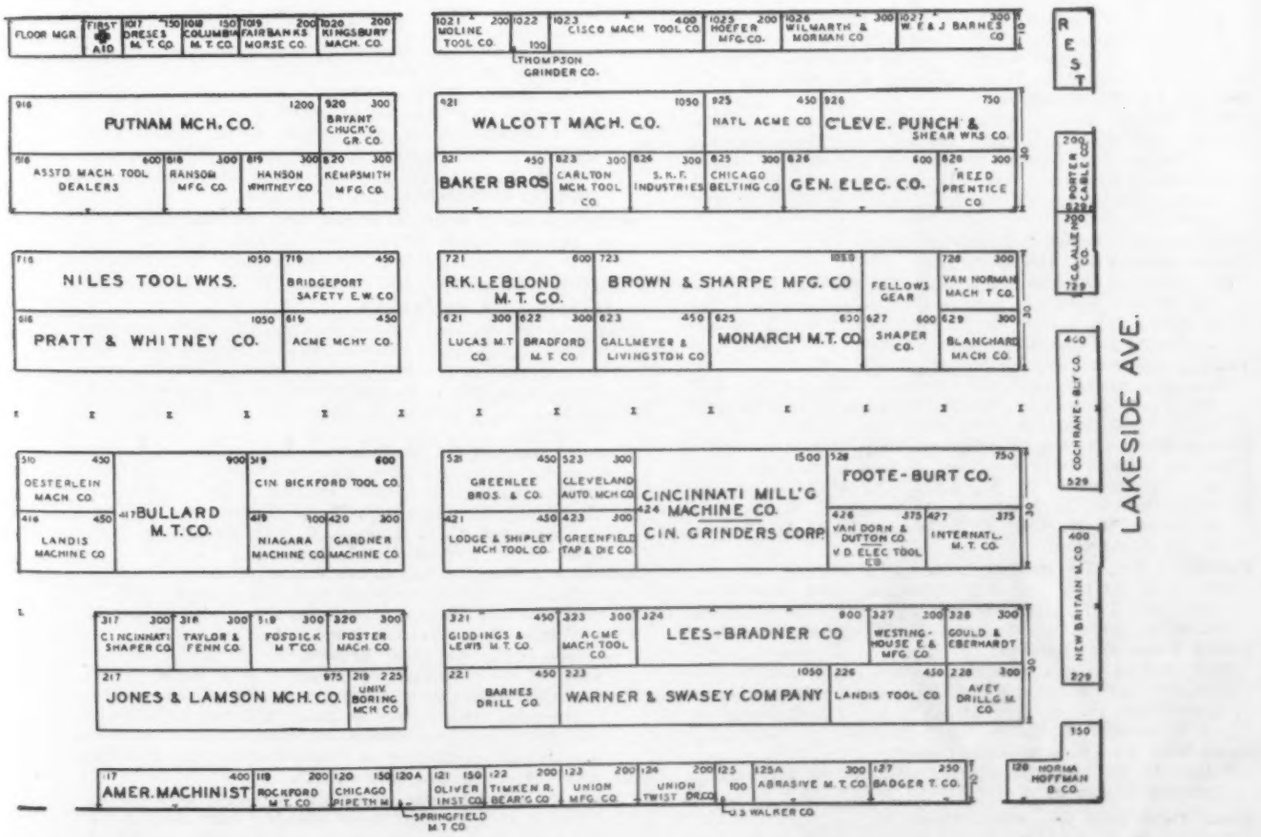
Motor driven ball bearing bench and floor grinder; motor driven floor grinder ball bearing; Rite speed heavy floor stand, M.D., and with ball bearings; portable grinder (swing type) M.D. and with ball bearings; grinding wheels in plain, safety and special shapes; safety collars. In attendance: H. G. Weinland, H. G. Bennett, W. H. Vance, Charles W. Gwyn.

William Sellers & Co., Inc., Philadelphia.

No. 1 tool grinder, No. 2 tool grinder, drill pointer, No. 2A drill grinder, 36-in. planer. In attendance: G. H. Benzon, J. C. Hinton, E. L. Holltes, J. D. McClintock, A. Sellers, Jr.



Booth Plan of the Exhibits in the Canopy Arcade with Names of Exhibitors and Booth Numbers



Exposition With Names of Companies Exhibiting and the Numbers of Booths To Be Occupied

Sidney Machine Tool Co., Sidney, Ohio.
18 in. x 10 ft. Sidney Monotrol geared-head lathe; 16 in. x 8 ft. Sidney Monotrol geared-head lathe. In attendance: A. C. Getz, B. A. Getz, H. A. Davies, W. A. McClure, M. K. Miller, E. A. Hawver.

S K F Industries, Inc., New York.
A range of S K F ball bearings and a lathe and chucking machine, equipped with S K F bearings. In attendance: R. H. DeMott, W. Jetter, J. B. Castino, W. C. Ahlers, T. H. Dessez, W. F. Temple, R. C. Byler.

Skinner Chuck Co., New Britain, Conn.
Skinner air-operated chucks both two and three jaw chucks of the adjustable and non-adjustable types; Skinner hand-operated chucks cut in section to show their construction; Skinner new heavy-duty chucks of the independent and universal scroll type. In attendance: K. H. Walther, engineer.

Sloan & Chace, Inc., Newark, N. J.
Motor driven No. 6 bench lathe, No. 5½ bench lathe, bench milling machine, magazine feed pinion cutter, 3½-in. gear cutter, S. & C. radius turning tool, tapping machine, drill presses. In attendance: William F. Smith, G. H. Anderson, M. P. Kernahan.

Smith & Mills Co., Cincinnati.
25-in. back-geared crank shaper, gear box type, arranged for constant speedmotor drive and including General Electric motor and starter. In attendance: J. E. Mills, C. G. Brockman, P. W. Yowler.

Springfield Machine Tool Co., Springfield, Ohio.
14 in. x 6 ft. engine lathe. In attendance: P. E. Montanus, Paul A. Montanus, Edward S. Montanus.

Standard Steel Specialty Co., Beaver Falls, Pa.
Machine keys, machine rack taper pins, Woodruff keys, special milled sections, elevator guides. In attendance: E. J. Wagner, J. B. Jamison, J. A. Espy, R. E. Wagner.

Standard Tool Co., Cleveland.
Red Shield twist drills (high speed steel); twist drills for all requirements; reamers (carbon and high speed steel, for all requirements); taps (carbon and high speed steel for all requirements). In attendance: H. C. McKean, W. P. Ross, R. R. Higgins, H. R. Hanson, Herman Will, T. D. Bascom, C. C. Buck, J. G. McGuire.

Stockbridge Machine Co., Worcester, Mass.
In attendance: Leon J. Barrett, Hubert G. Kilbourne, Ralph Simpson, Everett L. Edmunds.

Sundstrand Machine Tool Co., Rockford, Ill.
No. 5 Sundstrand Rigidmil with one opposed head and one vertical head; machine will be complete with cutters and fixtures and will be demonstrated on actual work; No. 3 Sundstrand Rigidmil which will be a standard machine on which slabs of steel will be machined to show the power and rigidity of the machine; 15-in. Sundstrand automatic production lathe which will be tooled up for a part and will be shown on actual work. In attendance: Charles B. DeVlieg, D. B. Burleigh, T. B. Buell, L. A. Dumser, W. G. Nichol, George W. Brunton, H. L. Olson, G. D. Sundstrand, E. J. Swenson.

Sun Oil Co., Philadelphia.
Cutting oils, motor oils, lubricating oils, rust proofing oils, Sunoco emulsifying cutting oil, tempering and quenching oils, display of parts machined with Sunoco emulsifying cutting oil. In attendance: Charles K. Hague, D. G. Proudfoot, G. B. Harding, Edward Morrison.

Swift Electric Welder Co., Kenton, Ohio.

Taylor & Fenn Co., Hartford, Conn.
Spline milling machine, vertical milling machine, ball bearing drilling machine, power-operated spring press, No. 0 spring foot press; No. 00 spring foot press. In attendance: George S. DeLany.

Thompson Grinder Co., Springfield, Ohio.
Thompson self-contained 10 x 36 universal grinding machine. In attendance: C. Baldenhofer, W. G. Baldenhofer, H. J. Warrick.

Timken Roller Bearing Co., Canton, Ohio.
Timken tapered roller bearings as used in machine tools. In attendance: L. M. Klinedinst, B. E. Keifer, R. W. Ballentine, W. B. Moore, A. G. Norris, J. W. Weir, R. P. Kelley, M. H. Kuhl, S. M. Weckstein, G. D. Thewlis, T. V. Buckwalter.

Torrington Co., Torrington, Conn.
Dayton-Torrington swaging machines and Torrington open-type and radial ball bearings. In attendance: G. H. Schneider, J. W. Blackford, F. T. Case, C. T. Moffatt.

Tuthill Pump Co., Chicago.
Plain coolant pumps, reversing coolant pumps, lubricating system pumps, general service pumps, high pressure multistage, gear pumps. In attendance: H. E. Kempton, O. L. Bock, J. B. Lacey, G. B. Tuthill.

Union Mfg. Co., New Britain, Conn.
Union chucks and Union chain hoists. In attendance: Edward I. Stevens.

Union Twist Drill Co., Athol, Mass.
Hob grinding machine, hobs, cutters, twist drills. In attendance: J. H. Horigan.

United States Electrical Tool Co., Cincinnati.
Portable electric drills, portable electric tappers, electric center and parallel grinders, bench and floor tool grinders. In attendance: G. M. Lawrence, G. E. Smith, Lawrence Thompson, R. H. Clore, E. C. Price, J. R. Miller, M. A. Gordy, W. R. Dorsey, M. A. Weidmayer, C. G. Cresswell.

Van Dorn Electric Tool Co., Cleveland.
Portable electric drills, portable electric grinders, portable electric screw drivers, portable electric tappers, portable electric nut setters, electric motor valve refacers. In attendance: F. H. Zulauf, O. C. Kiehne, F. R. Duguay, E. L. Connell.

Van Dorn & Dutton Co., Cleveland.
Lucas horizontal boring mill No. 43 transmission; gear display. In attendance: F. W. Sinram, F. C. J. Awig, L. G. Hewins, J. E. Stover, J. C. Miller.

Van Norman Machine Tool Co., Springfield, Mass.
No. 42 Van Norman internal radius oscillating grinder; No. 23 Van Norman internal radius oscillating grinder; No. 3 Van Norman external radius oscillating grinder; No. 10 Van Norman duplex miller; No. 20 Van Norman duplex miller. In attendance: C. E. Van Norman, J. Y. Scott, F. D. Van Norman, C. H. Whiting, W. Edes.

Walcott Machine Co., Jackson, Mich.
Melling contour lathe, Melling crank pin and cheek facing lathe, Melling cam lathe, Melling line bearing lathe, Walcott gear grinder. In attendance: D. G. Kimball, N. R. Townley, R. G. Williams, E. W. Ilett, C. H. Sylvester, W. D. Hunt, J. D. Forrer.

O. S. Walker Co., Inc., Worcester, Mass.
One single stroke surface grinding machine; a line of rectangular and rotary type magnetic chucks together with two samples of special style of chucks, one of these chucks having both vertical and horizontal face magnetized at the same time; a vertical chuck with opposite faces magnetized at the same time. In attendance: George F. Shirley, Elzear Laporte.

Warner & Swasey Co., Cleveland.
4-A Warner & Swasey universal turret lathe in operation on actual production job; 3-A Warner & Swasey universal turret lathe, new model with cross sliding turret on production job; 1-A Warner & Swasey universal turret lathe in operation on production job; No. 4 universal Warner & Swasey all-geared head-turret lathe in operation on production job. In attendance: P. E. Bliss, A. C. Cook, C. J. Stilwell, F. J. Pelich, W. K. Bailey, C. S. Stilwell, E. R. Gardner, G. Kochenderfer, W. L. Loegler, A. H. Keetch, L. K. Berry, R. L. Glaser.

Westinghouse Electric & Mfg. Co., East Pittsburgh.
Motors for machine tool application, including a.c. and d.c. motors and control; high frequency motors for high speed tools, motor parts for built-in motor drive, new design push button starters, induction frequency changer and silent Micarta gears. In attendance: F. E. Foisey, D. H. Byerly, G. H. Haynes, B. Lester, W. W. Reddie, E. H. Ott, R. P. Fairgrieve, H. B. Black, R. T. Cloyes, L. W. Hillshaffer, F. W. Sinran, A. H. Ahwig, L. G. Hewins, T. E. Laighton, O. N. Stone, A. M. Jones, H. F. Barton, B. L. Clegg, R. L. Attig, J. A. Franklin, Mr. Johnson, Mark Dawson, J. M. Ireland.

Wicaco Screw & Machine Works, Inc., Philadelphia.
Wicaco continuous oil groover; display case of screw machine products and rayon equipment. In attendance: Charles W. Lawser, Allison Sharp, William F. Hennessy.

J. H. Williams & Co., Buffalo.
Agrippa tool holders, Vulcan clamps, lathe dogs and snap gages, crank and balance handles, screw wrenches, drop-forged wrenches (carbon steel), special drop-forgings to order. In attendance: A. S. Maxwell, J. C. Scanlon, A. F. Carew, H. Nelson, A. E. Schierbaum, H. Wisbauer.

Williams White & Co., Moline, Ill.
Osterholm surface grinders, Bates pneumatic hammer, eye bender, vertical bulldozer, spacing table (model). In attendance: H. Ainsworth, W. L. Eiteman, C. W. Fiske, H. C. Hoover, G. P. Kline, J. E. Maynard, W. C. Osterholm, H. H. Rogers, Frank Ryman.

Wilmarth & Morman Co., Grand Rapids, Mich.
No. 78 super surface grinder, wet motor drive, with 220 volt, 3-phase, 60-cycle motor; No. 3 wet surface grinder, belt drive; No. 1 surface grinder, belt drive; No. 1 universal cutter and tool grinder, power feed, complete with all attachments, motor drive with three motors, 110 volt, single-phase, 60-cycle; No. 99 cutter and tool grinder, belt drive; style JB point improved New Yankee drill grinder, motor drive, 220 volts, 3-phase, 60-cycle. In attendance: Charles H. Slaughter, Arthur Williams.

Wisconsin Electric Co., Racine, Wis.
No. 1-JG grinder, type A motor, No. 2-AG grinder, type C motor, No. 3 multi-speed grinder, type SAX motor, No. 2-AD drill, type D motor. In attendance: William Thronson, W. B. O'Neill, C. A. Pope.

Machinery Markets and News of the Works

ORDERS GAIN SLIGHTLY

Machine Tool Business Running a Little Ahead of Last Month

Trade Expects That Considerable Buying Will be Done at National Exposition in Cleveland Next Week

ORDERS for machine tools are running slightly ahead of August business, but the gain is not so large as had been expected this month, a situation due in part, it is believed, to the fact that many companies are deferring all important purchases until they have had an opportunity to inspect the new and improved machines which will be exhibited next week in Cleveland at the National Machine Tool Exposition. There will be upward of 170 exhibitors, many of whom will have machines that have never before been shown.

The trend of machine tool business is upward for the first time since the decline set in last spring. July was the low month, with August business showing a gain, and it is expected that September will go slightly ahead of August. There is a general expectation that October will show a greater gain.

Railroads and the automobile industry are buying very little new equipment, and the slight increase in activity in machine tool markets has come mostly from the general industrial group. One of the brightest spots in the Chicago market is the demand from manufacturers of agricultural equipment.

New York

NEW YORK, Sept. 13.

MACHINE tool business continues to improve moderately. The downward trend, which started last spring, apparently was checked in August, and sales during August and thus far in September have been above the low point reached in June and July. However, the volume is still far from satisfactory. It now appears certain that most of the more important buyers of tools in this territory will send representatives next week to the National Machine Tool Exposition in Cleveland, and in many cases machine tool appropriations are being held intact until these buyers have had the opportunity to inspect the many new and improved types of machines which will be shown there. Many of the current buyers are bargain hunters; this has stimulated demand for used tools, of which there is again a large supply in the market.

Among the sales of new and used tools in the past week were the following: A 90-in. wheel quartering machine and an engine lathe to the New York Central; a single-spindle bench drill to a Chicago company; a duplex hand centering machine to a Syracuse, N. Y., manufacturer; a bench lathe to a company at Bristol, Conn.; two lathes to a Los Angeles company; a die sinking machine to a Detroit motor manufacturer; a high-speed drilling machine to a New York company; a cone-head lathe to a piston ring manufacturer on the Pacific Coast; a geared-head lathe to the Southern Pacific; a used universal milling machine to a Cincinnati company; a 4-ft. heavy-duty radial drill to an Ohio machinery company; a 6-in. pipe machine to a Cincinnati manufacturer; a twist drill grinder to a school at Whittier, Cal.; a used horizontal disk grinder to a Wisconsin machinery builder; a used hand spline milling machine to a Detroit company.

Stephen H. Cossey, Tottenville, S. I., operating a shipbuilding yard is at the head of a project to organize a new company to take over and convert the plant for the production of steel vessels, primarily steel barges. The yard heretofore has been used for the building of wooden craft. The entire project is reported to cost in excess of $200,000.

William Shary, 41 Union Square, New York, architect, has filed plans for a two-story automobile service, repair and garage building, 100 x 142 ft., to cost approximately $500,000 with equipment.

The State Department of Health, Division of Laboratories and Research, Capitol Building, Albany, N. Y., is asking bids until Sept. 29 for a new power house and other buildings. Sullivan W. Jones, Capitol Building, is state architect.

The Ford Motor Co., Detroit, has an expansion program in progress at its plant at Green Island, near Troy, N. Y., and will develop a department for the manufacture of batteries as well as other automobile accessories. The project will be carried out in connection with the change in model of the Ford car. The company has contracted with the Municipal Gas Co., Albany, for industrial gas for service at the works.

The Board of Transportation, 49 Lafayette Street, New York, is asking bids on a general contract until Sept. 30 for the construction of its proposed group of car shops for the new subway lines, on site bounded by Tenth Avenue, Harlem River, 207th to 215th Streets, including machine shops, wheel and axle shops, carpenter and woodworking shops, electrical repair shops, etc. The entire project will cost approximately $3,000,000 with equipment. J. H. Delaney is chairman.

The Northern Bronze Works, Long Island City, has acquired a building, 51 x 200 ft., at 899 Crescent Avenue, for a consideration of $41,000, and is reported to be planning a new shop at that location.

School District No. 1, Eastchester, N. Y., is said to be planning the installation of manual training equipment in a new three-story high school, at the White Plains Road and Stewart Place, to cost $275,000, for which superstructure will soon begin. Tooker & Marsh, 101 Park Avenue, New York, are architects.

The Union Railway Co., 2396 Third Avenue, New York, operated by the Third Avenue Railroad, same address, has engaged E. H. Faile & Co., 441 Lexington Avenue, engineers, to prepare plans for a two-story automobile service, repair and garage building at White Plains, N. Y., for its local motor bus system, to cost $150,000 with equipment. It is expected to ask bids on general contract before the close of the month.

The Albany Port District, Albany, N. Y., is arranging for a bond issue of $1,000,000, the fund to be used in connection with proposed local port development, including wharves, grain elevators, transit sheds, freight car and other terminal facilities, with traveling cranes, elevating and conveying machinery and other freight-handling equipment. The grain elevator will be equipped for a capacity for handling 1,000,000 tons per annum. The entire project will cost approximately $6,000,000.

The Columbia Refrigerator Co., Inc., Newton, N. J., is said to be planning to rebuild the portion of its plant destroyed by fire Sept. 4, with loss of more than $100,000 with equipment.

The Board of Education, Fort Lee, N. J., plans the installation of manual training equipment in a new two-story high school to cost upward of $350,000, for which bids are being asked on a general contract until Sept. 27. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

The Splitdorf-Bethlehem Electrical Co., 392 High Street,

Newark, N. J., manufacturer of ignition equipment and other specialties, has concluded negotiations for the purchase of the Perfection Appliance Co., 2111 Lyman Avenue, Detroit, manufacturer of electric ironing appliances and kindred products. The new owner will take immediate possession and proposes to continue production at the Detroit works as a subsidiary organization. Walter Rautenstrauch is president of the purchasing company.

The Wright Aeronautical Corporation, Lewis Street, Paterson, N. J., manufacturer of airplane engines, etc., is said to be planning an expansion program to cost more than $500,000, with buildings and machinery. The company has recently acquired the site of its present plant, with available land for extensions, for a consideration of $400,000.

The Public Service Electric & Gas Corporation, Public Service Terminal, Newark, N. J., is completing plans for the early construction of a new equipment storage and distributing plant, with repair facilities, at Jersey City, N. J., to be two-stories and basement, 125 x 195 ft., estimated to cost $150,000 with equipment. The work will include an automobile service, repair and garage building for company trucks and cars.

The Western Electric Co., 195 Broadway, New York, has awarded miscellaneous contracts for the completion of additions to its plant at Kearny, N. J., totaling about 175,000 sq. ft. of floor space, all of which will be devoted to manufacture. The expansion will cost in excess of $500,000 with equipment.

E. V. & C. F. Warren, Essex Building, Newark, architects, have plans for a new two-story automobile service, repair and garage building, 120 x 202 ft., at East Orange, N. J., to cost close to $100,000 with equipment.

The Hanson & Van Winkle Co., Newark, N. J., and A. P. Munning & Co., Matawan, N. J., manufacturers of equipment and supplies for the electroplating industry, have formed the Hanson-Van Winkle-Munning Co. which will continue to manufacture the principal products of both companies. A. P. Munning, president of the Munning organization, will be chairman of the board of the new company and Van Winkle Todd, president Hanson & Van Winkle Co., will be president. The company will maintain offices for the present at 339 Chestnut Street, Newark, and plants will be continued at Newark, Matawan and Chicago.

The Rhodes Railway Equipment Co., Inc., Times Building, New York, has been organized to deal in electric railroad properties, electric and steam railroad locomotives, cars and equipment and electric power plants. The company does not expect to manufacture extensively at present.

The Bridgeton Building Products Co., Bridgeton, N. J., has been formed to manufacture magnesite stucco, roofing materials and concrete products. A factory building has been acquired, and the company is interested in securing prices on concrete mixing machinery.

Philadelphia

PHILADELPHIA, Sept. 12

THE Charles Wacker Co., 1345 West Cumberland Street, Philadelphia, operating a wagon-building and repair works, body factory, etc., has awarded a general contract to E. E. Hollenback, Inc., 1910 North Marshall Street, for an addition to cost about $25,000 with equipment.

The Certain-Teed Products Corporation, Second and Erie Streets, Philadelphia, manufacturer of roofing products, etc., is having plans drawn for a four-story addition, to cost close to $200,000 with equipment. Klipstein & Rathman, Security Trust Building, St. Louis, are architects.

The Metropolitan Body Co., 5808 Arch Street, Philadelphia, manufacturer of automobile bodies, with headquarters at Bridgeport, Conn., has concluded negotiations for the purchase of a one-story building, 83 x 205 ft., at Leiper and Ruan Streets, recently completed, and will occupy for a new local works.

The Carborundum Co., Niagara Falls, N. Y., manufacturer of abrasive materials, etc., has acquired a controlling interest in the American Resistor Co., Packard Building, Philadelphia, manufacturer of non-metallic electrical heating elements, resistors, etc., sold under the trade name Globar, with main works on Cold Spring Avenue, Milwaukee. The new owner is arranging for a reorganization of the company, which will be continued as a subsidiary, and will take out a charter in New York, under the name of the Globar Corporation, capitalized at 16,700 shares of stock, no par value, to succeed to the former company. The new corporation will soon arrange for a bond issue of $650,000 to carry out the acquisition.

The Berger Mfg. Co., Sixteenth and Washington Streets, Philadelphia, manufacturer of metal products, has awarded a general contract to Metzger, Fisher & White, Otis Building, for a one-story addition, 25 x 125 ft., to be equipped as a power house, to cost close to $30,000.

H. R. Gelwicks, Inc., Mechanicsburg, Pa., recently chartered under State laws, plans the operation of a local repair and parts plant for aircraft service. H. R. Gelwicks and John M. Adams, both of Mechanicsburg, are heads.

The Lancaster Poster Advertising Co., Lancaster, Pa., has revised plans in progress for a one and two-story sign and display manufacturing plant, to cost $30,000 with equipment. H. Y. Shaub, 20 North Queen Street, is architect.

The Walter P. Miller Co., 452 York Avenue, Philadelphia, manufacturer of corrugated paper boxes and packages, has filed plans for a new plant, to cost $85,000, for which general contract recently was let to the Fred A. Havens Co., 845 North Nineteenth Street. Walter P. Miller is head.

Officials of the Pennsylvania Power & Light Corporation, Allentown, Pa., have organized a group of subsidiary utilities to construct transmission lines and operate in Montgomery, Lebanon and Dauphin Counties. Operations will begin soon. P. B. Sawyer and C. M. Walter are officials of the parent organization.

The Commissioners of Public Works, Camden, N. J., are planning an early call for bids for a new pumping plant and sewage disposal station, with electric power and other mechanical equipment, to cost upward of $100,000 with equipment. W. DeWitt Vosbury, Camden, is engineer.

The Philadelphia Motor Service Co., Nineteenth and Buttonwood Streets, Philadelphia, has filed plans for a one-story service, repair and garage building, 115 x 145 ft., to cost about $45,000 exclusive of equipment.

The Bates Valve Bag Corporation, Nazareth, Pa., manufacturer of bag-filling machinery, has been chartered under Delaware laws to take over the Bates Valve Bag Co. The new organization has arranged for a bond issue of $3,000,000, a portion of the fund to be used for the acquisition of the property of the former company and for expansion. Officials of the company have formed an affiliated interest, to be known as the Bates International Bag Co., to take over and develop the foreign properties and business of the parent concern. Headquarters will be maintained at Chicago, and plants at Nazareth, New Castle, Pa., Niagara Falls, Ont., and other points will be continued. J. W. Meaker is president.

The Pennsylvania Water Service Co., Wilkes-Barre, Pa., operating water pumping and distributing plants, has arranged for a bond issue of $9,200,000, a portion of the fund to be used for expansion in facilities. The company is affiliated with the Federal Water Service Corporation.

The Warren Mfg. Co., New York paper manufacturer, has awarded contract to the H. K. Ferguson Co., Cleveland, for additions to its plant at Milford, N. J. The work includes a machine room, 81 x 225 ft., two stories, with runway for a 10-ton crane; two-story finishing building, 72 x 144 ft.; train shed, 25 x 180 ft., and office building.

New England

BOSTON, Sept. 12.

BUSINESS the past week was confined for the most part to a few small used machines. Machine tool houses take an optimistic view of the future, regardless of the current inactivity. Many prospective customers have signified their intention of viewing equipment at New Haven, and at the coming machine tool exhibitions at Cleveland before making purchases, and it is believed business will not show much sign of life until toward the last of this month. October should be a good month, according to the trade. In addition to users of metal-working equipment desiring new tools for specific purposes, there is considerable negotiation under way by smaller shops now in operation or contemplating starting this fall. Competition for business is keen and details regarding these inquiries are withheld.

Small tools are selling better, but business is hardly active. Many shops, however, are buying in larger quantities than at any time since last spring.

The Studebaker Sales Co., 109 Brookline Avenue, Boston, has started work on a two-story and basement, 105x246 ft. sales and service station at Jersey and Boylston Streets, Plans are private.

Carl J. Malmfeldt, 118 Asylum Street, Hartford, Conn., architect, is drawing plans for a trade school at 110 Washington Street. L. W. Wheelock, Municipal Building, is looking after the city's interest in the school.

The General Electric Co., Lynn, Mass., has awarded a general contract to the C. W. Wright Co., Inc., 23 Central Avenue, for a one-story addition, to cost upward of $40,000 with equipment.

Officials of the Ives Mfg. Co., Bridgeport, Conn., manu-

The Crane Market

THERE is a fair volume of inquiry for overhead equipment, but the locomotive crane field continues quiet. It is estimated in some quarters that the Board of Transportation will eventually require twenty or more overhead cranes for the shops of the new subway at 207th Street and Tenth Avenue, New York. The General Electric Co. is not yet reported to have closed on about nine small capacity electric cranes for export and is not expected to purchase the 15-ton overhead crane for Schenectady for some time.

Among recent purchases are:

Barstow Management Associates, Reading, Pa., two 5-ton, 45-ft. 10-in. span, 1-motor, overhead cranes for the Binghamton Light, Heat & Power Co., Binghamton, N. Y., from the Reading Chain & Block Corporation.

Pennsylvania Railroad, Philadelphia, two 20-ton, 108 ft. span, 3-motor overhead cranes from an unnamed builder.

R. H. Comey Co., Brooklyn, N. Y., four 3-ton, 3-motor overhead cranes reported purchased from the Shepard Electric Crane & Hoist Co.

New York Rapid Transit Corporation, 85 Clinton Street, Brooklyn, N. Y., five 1½-ton hand power, pillar type, jib cranes from the Box Crane & Hoist Corporation.

Phoenix Utility Co., 71 Broadway, New York, two 2-ton electric hoists from the Box Crane & Hoist Corporation.

Tietjen & Lang Drydock Co., Hoboken, N. J., an 8-ton, 17-ft. span hand power crane from the Box Crane & Hoist Corporation.

Boston & Maine Railroad, Boston, Mass., a 40-ton electric overhead crane from the Whiting Corporation.

J. A. Mahlstedt Lumber Co., New Rochelle, N. Y., a 25-ton locomotive crane from the Browning Crane Co.

St. Louis-San Francisco Railway, St. Louis, a 10-ton hand power crane from H. D. Conkey & Co.

Briggs Mfg. Co., Detroit, a 3-ton electric overhead crane from H. D. Conkey & Co.

City of Ponca, Okla., a 10-ton double girder, hand power crane from H. D. Conkey & Co.

facturer of toys, etc., are completing plans for a reorganization of the company, with increase in capital to 7250 shares of stock, no par value, to provide for general expansion.

The New England Concrete Pipe Corporation, 79 Milk Street, Boston, recently organized with a capital of $100,000, will proceed with construction by day labor on its proposed new plant at Newton, Mass., for the production of cast concrete pipe. The main unit will be one and one-half stories, 150 x 200 ft. The entire project will cost more than $50,000 with machinery. S. G. Rutherford, address noted, will be in charge of erection, and will also act as president of the company. Henry C. Eames is treasurer.

The Palmer-Mullin Co., 60 Franklin Street, Boston, plumbing equipment and supplies, has preliminary plans for a new two-story works, with pipe shop, cutting and threading departments, etc., to cost close to $45,000 with equipment. C. F. Springall, 84 Sprague Street, is architect.

The Pierce Metal Mfg. Co., Brattle Street, Boston, has leased space in the building at 33 Chardon Street for expansion.

The Boston Ice Co., 110 State Street, Boston, has awarded a general contract to the Scully Co., 238 Main Street, Cambridge, for a one-story ice-manufacturing plant, 100x180 ft., to cost about $75,000 with equipment. C. Leslie Weir, care of the Knickerbocker Ice Co., 41 East Forty-second Street, New York, is architect and engineer.

The Board of Water Commissioners, Springfield, Mass., has awarded a contract to Daniel O'Connell Sons, Holyoke, Mass., for the installation of a steel pipe line, with joints electric-welded, from the Provin Mountain section to the city.

The Worcester Consolidated Street Railway Co., Worcester, Mass., has awarded a general contract to the J. W. Bishop Co., Worcester, for a one-story bus service, repair and garage building, to cost about $85,000 with equipment

The Exeter & Hampton Electric Co., Hampton, N. H., will issue bonds for $100,000, a portion of the fund to be used for extensions and improvements in plant and system.

The Fire Department, Purchase Street, New Bedford, Mass., is completing plans for a two-story mechanical repair shop for motor truck and fire equipment service, to cost more than $40,000 with equipment. Hammond & Sons, 170 North Water Street, are architects.

The Greenwich Water Co., Greenwich, Conn., will build a pumping plant at Putnam Lake, in connection with a new water purification works. The entire project will cost $225,000 with machinery.

The Hemming-Walsh Mfg. Co., 63 Bradley Street, New Haven, Conn., has purchased the building of the Holmes Mfg. Co., Shelton, Conn., and will manufacture stainless steel knives and forks.

Buffalo

BUFFALO, Sept. 12.

THE Jefferson Union Co., Lockport, N. Y., manufacturer of pipe unions, etc., is removing its factory at Lexington, Mass., to the local plant on Grand Street, and will develop increased output.

The Crosby Co., 197-99 Pratt Street, Buffalo, manufacturer of steel stampings, dies, etc., has filed plans for a one-story addition, primarily for enameling operations.

The Columbus-McKinnon Chain Co., Tonawanda, N. Y., has arranged for the removal of executive and sales offices from its plant at Columbus, Ohio, to the works at Tonawanda, which will be developed as the main manufacturing center and operating headquarters. Branch plants at Columbus, Lebanon, Pa., and St. Catherines, Ont., will be continued in service. Officers who will now be located at Tonawanda include Julius F. Stone, Jr., vice-president and general manager; J. C. Dunn, secretary and treasurer, and D. S. Brisbin, sales manager.

The Rochester Gas & Electric Corporation, Rochester, N. Y., has begun an expansion program at its hydroelectric generating station on the Genesee River, at the falls on Driving Park Avenue. The present plant, known as Station 5, has a capacity of 32,000 hp. and additional equipment will be installed to develop a total output of 60,000 hp. Thomas H. Yawger is superintendent of the electric division.

The Rochester Auto Parts, Inc., 135 Culver Road, Rochester, will soon ask bids on a general contract for a new one-story plant, including machine shop and other departments, to cost more than $200,000 with equipment. Leander McCord, Tyler Building, is architect.

The J. F. O'Connor Sales Co., 1641 East Genesee Street, Syracuse, N. Y., has awarded a general contract to the O'Brien Construction Co., 104 Madison Avenue, for a new three-story automobile service, repair and garage building, totaling about 46,000 sq. ft. of floor space, to cost approximately $210,000 with equipment.

The Dilts Machine Co., Fulton, N. Y., has awarded contract to Walter Bradley for the erection of a brick building, 50 x 150 ft., as an extension to its foundry and machine shop. The company manufactures paper mill supplies, castings, etc.

The Rome Electrical Co., Inc., Rome, N. Y., has been organized to conduct the business of the Rome Electrical Co., maker of magnet wires for electrical purposes. George A. Clyde will continue as general manager of the company. No new purchases are contemplated at present.

Pittsburgh

PITTSBURGH, Sept. 12.

MACHINE tool dealers have quoted against a large number of items since the first of the month, but have received very few orders. The usual reason offered for the lack of purchases is that buyers are holding back for the exhibition in Cleveland next week. There are seven items but only one machine in the last quarter list for the Sharon works of the Westinghouse Electric & Mfg. Co. The Bessemer & Lake Erie Railroad is yet to buy a number of tools on an inquiry issued last March for its Albion, Pa., shops.

The Board of Education, Fulton Building, Pittsburgh, has preliminary plans under way for a six-story boys' trade and vocational school, to cost close to $1,300,000 with equipment. E. B. Lee, Chamber of Commerce Building, is architect; and C. L. Woolridge, Fulton Building, consulting engineer.

The West Penn Electric Co., West Penn Building, Pittsburgh, operating electric light and power properties, electric railroads, etc., has disposed of a preferred stock issue of $8,300,000, a portion of the proceeds to be used for extensions and betterments.

The Erie Railroad Co., 50 Church Street, New York, has awarded a general contract to the Schofield Construction Co., Schofield Building, Cleveland, for a one-story addition to

its engine house, with additional repair facilities, at Meadville, Pa., to cost upward of $60,000.

The Lubeno Coal Co., Eighth and Warwood Streets, Wheeling, W. Va., is said to be planning the construction of a new power house, to cost close to $25,000 with equipment

The Southwest Pennsylvania Pipe Lines, Inc., Oil City, Pa., has concluded negotiations for the purchase of the pipe lines and system of the Pure Oil Co., from Coraopolis to the Pennsylvania-West Virginia State lines, and will take over the property at once, consolidating with its other lines in this vicinity. Extensions are planned for connection with system of the purchasing company. The National Transit Co., Oil City, has secured the pipe lines of the Producers' & Refiners' Co., in Butler County, and will carry out an expansion program in this district.

The Guyan Machine Shops, Logan, W. Va., machinery dealers, have inquiries out for a japanning oven, suitable for handling large armatures, either natural gas or electrically operated; several I-beam hoists, 1 to 2 tons capacity, a.c. or d.c. or operation; a lifting magnet, 220-volt, d.c.; and motors from 2 to 20 hp., with and without starters.

The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., has appointed the Dravo-Doyle Co., Pittsburgh, as its district sales representative.

Chicago

CHICAGO, Sept 12.

THIS market is marking time. Sales of machine tools are few and usually in the smaller sizes. Inquiry is a little more active, but buyers are holding off before placing orders. The nearness of the Cleveland machine tool exhibition is believed by some to be responsible for a market that does not measure up to last month. Probably the brightest spot in the machine tool business in this district is the demand for machinery emanating from farm equipment builders. Sales and inquiries from the railroads are unusually dull.

W. P. Porkorney has opened a new jobbing shop for which he has purchased a No. 1 universal miller, a 14-in. tool-room lathe, a 14-in. shaper, a speed lathe, a floor grinder, two turret lathes and a power saw.

The R. G. Haskins Co., Chicago, manufacturer of flexible shafts, has purchased a factory and office building at 4636 Fulton Street.

The City Council, Waverly, Ill., has plans under way for a pumping plant to cost $150,000.

The Central States Electric Co., Iowa Falls, Iowa, has prepared plans for an addition to its local power house and the installation of a 3500 kw. turbo generator and auxiliary equipment.

A. W. Trybula, 1507 West Madison Street, Chicago, will build a two-story brick automobile engine school, 77 x 125 ft., to cost $50,000. William G. McNulty & Brothers, 58 East Washington Street, are the general contractors.

Deere & Co., Third Avenue, Moline, Ill., manufacturers of plows and other agricultural implements, have awarded a general contract to J. H. Hunzinger & Co., Security Building, Davenport, Iowa, for a five-story addition near their present plant, estimated to cost about $225,000.

The Rockford Auto Co., 2204 Oxford Street, Rockford, Ill., E. P. Reber, in charge, is preparing plans for a five-story and basement service, repair and garage building, 67 x 156 ft., to cost close to $140,000 with equipment. F. A. Carpenter, Brown Building, is architect.

The L. W. Bollmer Co., Malvern, Iowa, is planning to rebuild its cold storage and refrigerating plant recently destroyed by fire, with loss reported at $90,000 including machinery.

The City Council, Carmi, Ill., has plans under way for extensions and improvements in the municipal electric light and power plant, to cost about $50,000 with equipment.

M. O. Nathan, 123 West Madison Street, Chicago, architect, is completing plans for a new three-story automobile service, repair and garage building, to cost close to $275,000 with equipment.

The Morrisey Foundry Co., 308 West Robert Street, Crookston, Minn., has been acquired by new interests, headed by J. E. Lappen of the Lappen Fibre Co., Crookston. Immediate possession will be taken. The plant will be continued in service as heretofore, and no changes will be made in present operations.

The Northwestern Grain Elevator Co., Council Bluffs, Iowa, is said to be planning the construction of a new grain elevator, 125 x 350 ft., with capacity of 2,000,000 bu., to cost in excess of $450,000 with machinery.

The Atomized Fuel Corporation, 20 North Twelfth Street, Fort Dodge, Iowa, is completing plans for a new plant for prepared fuel production, to cost $75,000 with equipment. Conveying machinery will be installed. R. E. Heal is secretary and treasurer.

The Keller Products Co., 5517 West Chicago Avenue, Chicago, manufacturer of soda fountain equipment and supplies, has acquired a one-story factory, 50 x 125 ft., at 4612-14 West Superior Street, for a new plant. The present works will be removed to the new location and additional equipment installed.

The Bennett Organ Co., Rock Island, Ill., manufacturer of pipe organs, mechanisms, etc., has engaged Peterson & Johnson, Swedish-American Bank Building, Rockford, Ill., architects, to prepare plans for an addition to cost more than $200,000 with equipment.

The Hall Hardware Co., 608 Third Street, North, Minneapolis, Minn., will take bids at once for a new multi-story storage and distributing plant, to cost approximately $100,000 with equipment. Bertrand & Chamberlain, Northwestern Bank Building, are architects.

Ovens, power equipment, conveying and other machinery will be installed in the proposed three-story plant, 86 x 130 ft., to be erected by the Rochester Baking Co., Rochester, Minn., to cost about $90,000. It is expected to ask bids this fall. Louis B. Bersbach, Northwestern National Life Building, Minneapolis, Minn., is architect.

The Automatic Coffee Urn Co., 511-17 Seventeenth Street, South, Minneapolis, has been formed to manufacture coffee urns. It has sufficient factory space at present and purchases of supplies and equipment will be gradual.

Milwaukee

MILWAUKEE, Sept. 12.

THE machine-tool trade remains slow and without feature. Sales of single items continue but there has as yet been no appreciable upward trend in industrial construction calling for lot purchases. Production is going forward at a moderate rate. Confidence is expressed that the end of the vacation season will witness a revival in demand and that the trade will enter the fall and winter with better prospects than a year ago.

The Northwestern Engineering Works, Green Bay Wis., manufacturer of crawler type cranes, hoists and similar machinery, has let the general contract to Lorens Hansen & Sons, local, for the erection of a one-story shop extension, 86 x 164 ft. It was designed by the Wisconsin Bridge & Iron Co., Milwaukee, which also is furnishing the structural steel. The addition, with equipment, will cost about $80,000.

The Aluminum Goods Mfg. Co., Two Rivers, Wis., expects to take bids after Sept. 15 for the erection of a seven-story brick, steel and concrete addition to its local main plant. Lockwood, Greene & Co., 400 North Michigan Avenue, Chicago, are completing plans. The project will represent an investment of between $450,000 and $500,000. George Vits is president.

The Allen-Bradley Co., 286 Greenfield Avenue, Milwaukee, manufacturer of electric control devices, has placed the general contract with Walter W. Oeflein, Inc., 110 East Wisconsin Avenue, for the construction of buildings and extensions costing $250,000, not including equipment. A new eight and nine-story wing, 95 x 150 ft., five additional stories on the present three-story shop, 67 x 90 ft., and a one-story shipping building, 50 x 100 ft., will be erected. The architect is Fitzhugh Scott, 214 Mason Street, local.

The Milwaukee Gas Cock Mfg. Co., Milwaukee, has been organized for the production of gas cocks, service cocks and other brass specialties. The principals are represented by George E. Ballhorn, attorney, 120 East Wisconsin Avenue, Milwaukee. Definite plans will be announced later.

Thomas F. Hamilton, president Hamilton Aero Mfg. Co., Milwaukee, propellers, parts and materials, has decided to locate his proposed new aircraft manufacturing plant in Milwaukee. Recently the Hamilton Metalplane Co., Milwaukee, was incorporated with an initial capitalization of $275,000 to undertake the construction and operation of a plant. Among the principals is Clarence R. Falk, secretary-treasurer Falk Corporation. Definite plans for production space are now being made.

The United States Motors Corporation, Oshkosh, Wis., has been incorporated with a capital stock of $200,000 by local stockholders in the Universal Products Co., Oshkosh, manufacturer of gasoline engines and electro-generating systems, and on Sept. 1 took over the entire business of the Universal company. E. H. Huesener, for seven years general manager of the Universal company, has been made president of the United States corporation. Rufus K. Schriber, vice-president and treasurer, retains these offices. J. Bruske is secretary, and W. G. Maxcy, Oshkosh capitalist, is the additional member of the board. Under the change, the United States company will enlarge its activities in manufacturing marine and

industrial engines, motor truck and tractor power plants, etc., although continuing the present lines. Plans are being made for the addition of manufacturing space, but details have not been made public.

The Netter-Heiser Co., 702-706 Wisconsin Avenue, Milwaukee, Ford and Lincoln dealer, will build a $75,000 service garage, 120 x 230 ft., one story and part basement, at Fiftieth Street and Lisbon Avenue. The general contract has been let to R. W. Dwyer & Co., 187 Twenty-seventh Street, local.

The Universal Motor Co., Oshkosh, Wis., which is completing work on a new plant to be occupied shortly, has increased its capital stock from $200,000 to $500,000. The company manufactures gasoline engines, principally for marine and industrial use. The capacity is being increased more than 100 per cent and additions to the equipment are about to be made. E. H. Fahrney is president.

The Board of Public Works, Wauwatosa, Wis., suburb of Milwaukee, is taking sealed bids until Oct. 14 for the complete installation of a municipal garbage incinerating plant. A. V. Brigham is city clerk and secretary of the board.

The Perfect Motor Service Co., Racine, Wis., is beginning construction work on a new machine and service shop, 40 x 114 ft., part two stories and basement. The estimated cost, complete, is $30,000.

The Menasha Printing & Carton Co., Menasha, Wis., has let the general contract to C. R. Meyer & Sons Co., Oshkosh, Wis., for the erection of a boiler house addition costing approximately $35,000.

The Board of Education, Neenah, Wis., has accepted plans by John D. Chubb, architect, Chicago, for the proposed new combination senior high and vocational school, and is about to ask for bids on the construction of the building. It is to be ready about Aug. 1, 1928. The estimated cost is $250,000. Mrs. J. F. Gillingham is clerk of the board.

The Seaman Body Corporation, 1832 Richards Street, Milwaukee, subsidiary of the Nash Motors Co., Kenosha, Wis., has completed plans for another addition. The new unit will be five stories, 100 x 200 ft., the first three floors to be equipped for metal-working operations and the other floors for automobile body painting. The Dahlman Construction Co., local, has taken the general contract. Harold H. Seaman is president and general manager.

The Superior Water, Light & Power Co., Superior, Wis., is awarding contracts for the erection of a control house and two new filtration units in the waterworks plant and pumping station. The improvement will cost about $50,000. W. C. Lounsbury is general manager.

The Galloway-West Co., Fond du Lac, Wis., has plans by R. A. Sutherland, local architect, for a two-story machine and service shop, 50 x 100 ft. Charles S. Whitney, 214 Mason Street, Milwaukee, is consulting engineer on the mechanical work.

The Milwaukee Chair Co., 3022 Center Street, Milwaukee, manufacturer of business chairs, has let the general contract to E. C. Knuth & Co., local, for a three-story addition, 32 x 50 ft., and will add to its wood-working and metal parts equipment. Charles Eiff is secretary and manager.

Laybourn & Haman, 1733 Richards Street, Milwaukee, are beginning work on the construction of a garage, service and machine shop, 60 x 120 ft., part two stories and basement. The Oyer-Fuller Co., 530 Wisconsin Avenue, local, is general contractor.

St. Louis

ST. LOUIS, Sept. 12.

REVISED plans are being prepared by the Chouteau Avenue Auto & Wagon Co., 2118 Chouteau Avenue, St. Louis, for a one-story addition, 60 x 100 ft., to cost about $25,000, for which new bids will be asked soon. The structure will be used largely for body manufacture. Jacob Heim, Holland Building, is architect.

The Southwest Box Co., Tulsa, Okla., recently formed with a capital of $200,000 by A. T. W. Kerr, 1812 South Cheyenne Street, Tulsa, and associates, has engaged the Truscon Co., Youngstown, to prepare plans for a one-story factory, 90 x 475 ft., for the manufacture of special boxes and containers for airplane shipping service, to cost close to $90,000 with machinery. A site has been purchased on the Sand Spring Road.

The Star Square Auto Supply Co., 1129 Locust Street, St. Louis, Albert A. Sacks, president, is having plans drawn for a four-story and basement storage and distributing plant, 40 x 135 ft., to cost about $85,000 with equipment. Leo Abrahams, Chemical Building, is architect.

Ovens, power equipment, conveying and other machinery will be installed in the three-story plant to be erected at 4510 Parkview Avenue, St. Louis, by the Ward Baking Co., 367 Southern Boulevard, New York, cost $200,000 with equipment.

The Pine Glass Co., Okmulgee, Okla., has awarded a general contract to the Muskogee Iron Works, Muskogee, Okla., for a new plant with main unit, 170 x 260 ft., to cost $85,000 with equipment.

The Central Power Co., Grand Island, Neb., has arranged for a bond issue of $3,200,000, a portion of the fund to be used for extensions and improvements in power plants and system. The company is operated by the Middle West Utilities Co., 79 West Adams Street, Chicago. Martin J. Insull is president.

The Inland Power & Light Corporation, St. Louis, is said to be planning extensions and improvements in a recently acquired power plant at Clinton, Mo., including the installation of equipment to double, approximately, the present capacity, to cost more than $85,000.

The Utility Tool & Mfg. Co., St. Louis, has awarded a general contract to the W. C. Harting Construction Co., International Life Building, for a one-story machine shop, 48 x 145 ft., to cost $25,000 with equipment.

The Franklin Plumbing Supply Co., 1101 Franklin Avenue, St. Louis, plumbing and heating equipment and supplies, is said to be considering the erection of a new three-story storage and distributing plant, with pipe department, for cutting, threading, etc., estimated to cost approximately $70,000, with equipment. E. Eastman is one of the heads of the company, in charge.

The Shawnee Ice Co., Shawnee, Okla., is considering an addition to its ice-manufacturing plant at Wewoka, Okla., with new equipment to increase the capacity from 75 to 135 tons per day, to cost in excess of $80,000. E. W. Hill is president.

The Arkmo Lumber Co., Rector Building, Little Rock, Ark., W. C. Chamberlain, manager, is planning the early erection of a new mill at North Little Rock, to cost $100,000 with machinery. The L. B. Stephens Co., Little Rock, is engineer.

The Selden Sales & Service Co., 202 South Denver Street, Tulsa, Okla., will soon begin superstructure for a two-story and basement service, repair and garage building, 100 x 140 ft., to cost about $75,000 with equipment. A. C. Fabry, 619 West Twelfth Street, is architect.

Colin B. Kennedy, Inc., 3821 Laclede Avenue, St. Louis, has been organized to succeed the former Colin B. Kennedy Corporation and will continue the manufacture of radio receiving equipment. No additional equipment will be purchased during the present season.

Cleveland

CLEVELAND, Sept. 12.

THE demand for turret lathes in single tool orders has improved slightly, but otherwise the market continues very dull. That buying at present is almost at a standstill is attributed to the National Machine Tool Exhibition to be held in Cleveland next week. Quite a little new business is pending, but most prospective buyers are advising the trade that they will not place orders until after the machinery to be exhibited at Cleveland has been inspected. Interest at present is largely in replacement machines to reduce production costs.

A few manufacturing plants in metal-working industries in this district have increased operations which were curtailed during the summer, so there is little call for machinery for increasing output. The market continues very slow in the Michigan territory, where little purchasing is being done by the automotive industry.

The Ilerite Mfg. Co. has established a plant at 5103 Lakeside Avenue, N. E., Cleveland, where it will manufacture insulated lime testers and other electrical devices, including automobile stoplights. George A. Iler is president, and A. L. Krosen, vice-president and general manager.

The H. K. Ferguson Co., Cleveland, engineer and builder, will move to new quarters in the Hanna Building where it has acquired 12,000 sq. ft. of office space, providing larger quarters than formerly.

The Colonial Iron Works Co., Cleveland, has moved to its new plant at 17643 St. Clair Avenue and the New York Central Railroad, where it occupies over two acres of ground space. The plant is equipped with a 70-foot span overhead traveling yard crane and five shop traveling cranes.

The American Fire Clay Co., 2394 Canal Road, Cleveland, manufacturer of refractory products, is planning the erection of a new plant in the vicinity of Canfield, Ohio, to cost about $60,000 with machinery.

The Wehrle Stove Co., Newark, Ohio, manufacturer of cooking stoves, etc., has awarded a general contract to W. S. Jamison, 389 West Main Street, Zanesville, Ohio, for a one-

story foundry addition, to cost approximately $35,000 with equipment. W. W. Wehrle is president.

The City Council, Defiance, Ohio, has engaged R. Husselman, Cuyahoga Building, Cleveland, consulting engineer, to prepare plans for the proposed municipal electric light and power plant, for which a bond issue of $405,000 has been approved.

The Libbey-Owens Sheet Glass Co., Nicholas Building, Toledo, Ohio, has awarded a general contract to the A. Bentley & Son Co., 201 Belmont Street, for an addition to its sheet and plate glass manufacturing plant, to cost $1,800,000 with equipment. Lockwood, Greene & Co., Buhl Building, Detroit, are architects and engineers.

The Aetna Rubber Co., Ashtabula, Ohio, is said to be planning the construction of a new mill, to cost close to $65,000 with machinery.

The C. & G. Cooper Co., Mount Vernon, Ohio, manufacturer of stationary steam engines, has awarded contract to the H. K. Ferguson Co., Cleveland, for a one-story pattern shop, 100 x 129 ft., to cost about $25,000.

Gulf States

BIRMINGHAM, Sept. 12.

THE Texas & Pacific Railway Co., Dallas Tex., is planning the early rebuilding of its car repair and general machine shops at Big Spring, Tex., recently destroyed by fire, with loss reported in excess of $50,000 including equipment. E. F. Nutchell is chief engineer.

The Southern Gas & Utilities Co., City National Bank Building, San Antonio, Tex., has plans for the construction of a new pipe line for natural gas from San Antonio to New Braunfels, Seguin and vicinity, with distribution systems at these places and other localities, estimated to cost $750,000. The contractors for the installation are N. A. Saigh & Co., Builders' Exchange Building, San Antonio.

The West Florida Power Co., Tallahassee, Fla., has begun the construction of power dam and auxiliary work for a proposed hydroelectric generating plant on the Ocklockonee River, about 26 miles from the city. The project will require more than 12 months for completion. The initial station will be equipped for a capacity of 12,000 kw. The entire project will cost in excess of $600,000 with transmission lines. The company is operated by the General Engineering & Management Corporation, 50 Pine Street, New York.

The Laferia Irrigation District, Brownsville, Tex., is planning to rebuild the portion of its pumping plant recently destroyed by fire, with loss estimated at more than $50,000 including machinery.

The Prest-O-Lite Co., 30 East Forty-second Street, New York, manufacturer of acetylene equipment, welding apparatus, etc., has awarded a general contract to P. O. B. Montgomery, Dallas, for a new two and three-story plant on local site, to cost approximately $175,000 with equipment.

The Frost Cotton Oil Mill, Frost, Tex., is considering the rebuilding of the portion of its mill recently destroyed by fire, with loss estimated at close to $70,000 including equipment.

George E. Ehemann & Co., Bank of Commerce Building, Memphis, Tenn., have acquired a tract of 25 acres adjoining a lumber mill at Mount Pleasant, Tex., and have tentative plans for a new one-story hardwood mill, to cost upward of $65,000 with machinery.

The Texas Electric Steel Casting Co., 1515 Spring Street, Houston, Tex., is said to be planning extensions and improvements in present plant, with installation of additional furnaces and other equipment for considerable increase in capacity. It is understood that a stock issue will be arranged to provide funds for the program. F. A. Kroll is general manager.

Oliver H. Powell, 51 North Monterey Street, Mobile, Ala., and associates, are planning the early erection of a three-story automobile service, repair and garage building, to cost $110,000 with equipment.

The Winnfield Parish School Board, Winnfield, La., is considering the installation of manual training equipment in a proposed two-story high and grade school to cost $175,000, for which plans will be drawn by Herman J. Duncan, 118 Murray Street, Alexandria, La., architect.

The Baldwyn Brick & Tile Co., Baldwyn, Miss., has approved the installation of additional machinery for the manufacture of brick and tile, and will carry out an expansion program to cost more than $65,000 with machinery.

The Mack International Truck Corporation, Dallas, Tex., has leased a new one-story building, 70 x 215 ft., to be erected at 1910 South Pearl Street, for the establishment of a new factory branch, service and repair works. Headquarters are at 25 Broadway, New York.

Harvey M. Mansfield, 316 Franklin Street, Tampa, Fla., has inquiries out for a full revolving, crawler type shovel, either steam or gas-operated, about 1 yd. capacity.

The Universal Aircraft Corporation, 200 South Boaz Street, Fort Worth, Tex., has plans under way for a new one-story plant for the rebuilding and repair of airplanes, including parts, etc., to cost about $30,000 with equipment. Later it is proposed to establish a division for new aircraft production. A hangar will be built.

The Benson Hardware Co., Andalusia, Ala., contemplates rebuilding the portion of its storage and distributing plant, recently destroyed by fire, with loss reported at $75,000 including equipment.

Cincinnati

CINCINNATI, Sept. 12.

THE Superior Chevrolet Sales Co., 4000 Spring Grove Avenue, Cincinnati, representative for the Chevrolet automobile, is considering plans for a one-story addition to its service and repair shop, to cost about $70,000 with equipment. O. Schwartz, Provident Bank Building, is architect. P. K. Moorman is secretary and treasurer.

The Henry Vogt Machine Co., Tenth and Ormsby Streets, Louisville, manufacturer of ice and refrigerating machinery, has plans for a one-story addition, to be equipped as a fitting shop, including improvements in present shop, to cost upward of $40,000. D. X. Murphy & Brother, Louisville Trust Building, are architects.

The Cincinnati Street Railway Co., Dixie Terminal Building, Cincinnati, has awarded a general contract to the Fisher-DeVore Co., same address, for a one-story car repair plant, to cost $265,000 with equipment.

The Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until Sept. 23, for 78 propeller blades, 15 barrel assemblies, sleeve assemblies, etc., circular 32; also for 1057 exhaust head flanges, 300 container assemblies, remote controls, magneto springs and other equipment, circular 81.

J. D. Westcott & Son, Oneida, Tenn., operating a lumber mill and wood turning plant, plan to rebuild the portion of their mill recently destroyed by fire, with loss reported at $45,000 including equipment.

The Kingsport Foundries, Inc., Kingsport, Tenn., recently organized, has awarded a general contract to Jones & Wexler Co., Kingsport, for its proposed machine shop and foundry, 80 x 150 ft., pattern shop, 35 x 55 ft., and office, to cost close to $50,000 with equipment. W. E. Ring is vice-president and general manager.

The Department of Welfare, Oak and Ninth Streets, Columbus, Ohio, J. E. Harper, director, is having plans completed for a new power house at the Hospital for Feeble Minded, vicinity of Apple Creek, Ohio, to cost approximately $60,000. A mechanical laundry will also be built to cost about $35,000 with equipment. H. B. Briggs, Ohio Hartman Building, Columbus, is architect.

E. W. Cooper, Bennie-Dillon Building, Nashville, Tenn., engineer, is planning the early purchase of equipment for a phosphate grinding works, including a tube mill, about 4 ft. diameter and 16 ft. long; air separator and affiliated equipment.

The Howard & Woods Co., Chattanooga, Tenn., has awarded a general contract to the Stewart Construction Co., Eighth and Cherry Streets, for two automobile service, repair and sales buildings, each to be 75 x 235 ft., to cost close to $100,000 with equipment.

The Board of Education, Jackson, Ohio, contemplates the installation of manual training equipment in a proposed new high school to cost $275,000, for which plans will be drawn by Granville Scott, Citizens' Bank Building, Norwalk, Ohio, architect.

Detroit

DETROIT, Sept. 12.

THE Harter Rolled Metal Co., Goshen, Ind., has concluded arrangements with the Improvement Association, Sturgis, Mich., for the removal of its plant to that city, and will occupy a portion of the local factory formerly used by the Central Wheel Co. The Kant Kut Tube Products Co., Goshen, understood to be affiliated with the Harter Rolled Metal Co., has completed like arrangements for plant removal to Sturgis, and will use the remaining portion of the former factory of the Central Wheel Co. Both companies plan expansion in present output.

The City Council, Royal Oak, Mich., contemplates the installation of pumping machinery and power equipment in connection with proposed extensions and improvements in the municipal waterworks, to cost $500,000, for which plans will be drawn soon.

The Consolidated Electric Sign Co., Battle Creek, Mich., is considering the early rebuilding of the portion of its plant

destroyed by fire Aug. 31, with loss estimated at more than $150,000 including equipment.

The Edison Sault Electric Co., Sault Ste. Marie, Mich., is arranging for a new equipment storage and distributing plant with repair facilities, to cost upward of $65,000 with equipment.

The Detroit Gray Iron Foundry Co., 6403 Wight Street, Detroit, has work in progress on two one-story foundry units, to cost more than $75,000 with equipment. Two 96-in. and one 72-in. cupola will be installed, as well as blowers and other machinery.

The Driggs Corporation, Lansing Mich., manufacturer of airplanes and parts, occupying a factory near the municipal airport, is planning the early removal of the works to larger quarters where additional equipment and facilities will be provided.

The City Council, Bay City, Mich., has plans under way for the establishment of a municipal airport on the Saginaw River, about four miles from the city, where a tract of 80 acres has been secured. The project will include a group of hangars, mechanical and repair shops, oil houses and other buildings, and is reported to cost more than $175,000. The Bay City Chamber of Commerce is active in the project.

The Cliffs Power & Light Co., Ishpeming, Mich., a subsidiary of the Cleveland-Cliffs Iron Co., same address, is considering the construction of a new hydroelectric generating plant on the Escanaba River, near Princeton, Mich., to cost more than $250,000 with transmission line. O. D. McClure is general manager.

The Briggs Co., Grand Ledge, Mich., is planning to rebuild the portion of its brick manufacturing plant, recently destroyed by fire, with loss reported at close to $100,000 including equipment. Headquarters of the company are at Lansing, Mich.

The Board of Public Works, Mount Clemens, Mich., is said to be planning the installation of pumping machinery and power equipment in connection with proposed extensions and improvements in the municipal waterworks, to cost $600,000.

Indiana

INDIANAPOLIS, Sept. 12.

THE Auburn Automobile Co., Auburn, Ind., has concluded arrangements for the purchase of a controlling interest in Duesenberg, Inc., Indianapolis, formerly known as the Duesenberg Motors Co., manufacturer of automobiles; Lycoming Mfg. Co., Williamsport, Pa., manufacturer of automobile engines and other internal combustion motors, and the Limousine Body Co., Kalamazoo, Mich., manufacturer of automobile bodies. The companies will retain their separate identities, but will be operated under a single management in the future, the merger representing a total valuation of about $14,000,000.

The Red Ball Motor Truck Corporation, Illinois Building, Indianapolis, is completing plans for a new one-story plant at Frankfort, Ind., to cost more than $175,000 with equipment. J. J. Marley, 5 North La Salle Street, Chicago, is architect. W. B. Hiner is president.

Fire, Sept. 6, destroyed a portion of the factory branch and distributing plant of the B. F. Goodrich Co., 717 Fulton Street, Indianapolis, manufacturer of automobile tires and other goods, with main plant at Akron, Ohio, with loss reported at $50,000 including equipment.

The Board of Works, City Hall, Evansville, Ind., is planning the installation of pumping machinery, power and other equipment in connection with proposed extensions and improvements in the municipal waterworks, to cost $1,000,000. The Black & Veatch Engineering Co., Kansas City, Mo., is engineer.

The Board of Education, Evansville, Ind., contemplates the installation of manual training equipment in a proposed high and grade school at Lincoln and McCormick Avenues, to cost $400,000, for which plans will be drawn by Fowler & Karges, Furniture Building, architects.

The Industrial Supply Co., Terre Haute, Ind., has plans for a two-story addition, to cost about $21,000. Johnson, Miller, Miller & Yeager, 30 North Fifth Street, are architects.

The Southern Indiana Utilities Corporation, Corydon, Ind., recently formed under State laws with a capital of $300,000 and 15,000 shares of stock, will take over the local properties of the Railroaders' Gas Co. and will develop other natural gas holdings, as well as electric light and power facilities for service in this portion of the State. Pipe lines, transmission lines and distributing systems will be built. C. N. Van Cleve, 617 Traction Terminal Building, Indianapolis, is interested in the new company, which will be headed by Arthur G. Miller, St. Louis.

The Diamond Clamp & Flask Co., 528 North Fourteenth Street, Richmond, Ind., has purchased the Wayne Works Foundry building at Richmond which will increase its present floor space more than four times. The new building is completely equipped and will be occupied about Dec. 1. The company manufactures principally foundry equipment, including flasks, steel bands, steel pouring jackets, steel core plates and bottom plates.

South Atlantic States

BALTIMORE, Sept. 12.

A CENTRIFUGAL pumping unit, with capacity of about 250 gal. per min., is wanted by Joseph G. Mullen, 410 West Lombard Street, Baltimore.

The Betterton Ice & Electric Co., Betterton, Md., is planning the purchase of a 75 to 100-hp. engine-generator unit, direct-connected, preferably Fairbanks-Morse type.

The City Council, Savannah, Ga., is said to be arranging for the establishment of an airport on the Waters Road, where a 90-acre tract of land has been selected, to include hangars, repair and reconditioning shops, oil houses, etc.

M. P. McCalla, Lowndesville, S. C., has inquiries out for a steam shovel, crawler type, about 1 yd. capacity, to be used in the vicinity of Greenwood, S. C.

The Board of Education, Harrisonburg, Va., is considering the installation of manual training equipment in a proposed high school to cost $175,000, for which bids are being asked on a general contract. Charles M. Robinson, Richmond, Va., is architect.

L. B. Barrett, Plumtree, N. C., has inquiries out for an air compressor, belt-driven type, with capacity of 250 to 500 cu. ft. of air per min.

The Washington Gas Light Co., 411 Tenth Street, N. W., Washington, has awarded a general contract to the Davis, Wick & Rosengarten Co., Inc., 1406 G Street, N. W., for a new three-story and basement equipment storage and distributing plant, with mechanical shop division, to cost $275,000 with machinery.

The Miller Hydro Bottle Washer & Sterilizer Co., Bainbridge, Ga., recently organized by M. H. Nussbaum, Bainbridge, and associates, is said to be planning the early operation of a local building for the manufacture of bottle-cooling boxes and containers, and kindred special equipment.

Joseph S. Potts, Jr. & Co., Richmond, Va., are in the market for a Diesel engine-driven air compressor unit, comprising a 1200 cu. ft. multi-stage compressor with 200 hp. Diesel engine, and accessories.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for a 50-ton gasoline locomotive, standard gage.

Price E. Hertz, 869 Broadway, Macon, Ga., is at the head of a project to construct and operate a tile manufacturing plant. A site has been selected on Poplar Street; the initial unit is reported to cost in excess of $65,000 with machinery.

The Southeastern Mineral & Mining Co., Aiken, S. C., is planning the early installation of additional equipment at its properties, including steam shovel, mechanical drying apparatus, crushing machinery, pulverizers and other equipment. Albert T. Maurice is president.

Lewter F. Hobbs, Inc., McKevitt Building, Norfolk, Va., contractors' equipment, is in the market for a steel storage bin, with capacity of about 115 tons, Blaw-Knox or similar type.

Pacific Coast

SAN FRANCISCO, Sept. 7.

THE City Council, San Francisco, is arranging for a bond issue of $1,800,000, the fund to be used for the construction of power substations and steel tower transmission lines for conveying power from the Moccasin Creek-Hetch Hetchy water power project to San Francisco. The proposed bonds will be placed before voters for ratification at the November election.

The Winehaven Chemical Co., 433 California Street, San Francisco, has engaged Oscar Kranz, Fourth and Bryant Streets, architect, to prepare plans for extensions and improvements in property recently acquired at Winehaven, Cal., to be converted for the production of industrial alcohol. It is estimated to cost $300,000 with equipment.

The Crystal Ice & Cold Storage Co., Glendale, Ariz., is completing plans for a one-story addition to its ice-manufacturing and refrigerating plant, 135 x 160 ft., to cost in excess of $50,000.

The Board of Education, South Pasadena, Cal., will build a one-story manual arts and vocational school unit in connection with a new junior high school group on Fair Oaks Avenue. The entire project will cost about $400,000. Norman F. Marsh & Co., Broadway Central Building, Los Angeles, are architects.

The Beaver Cove Pulp & Timber Co., care of D. C. Henry, 1218 Spalding Building, Portland, consulting engineer, is arranging for a new pulp and paper mill at the

north end of Vancouver Island, to include a hydroelectric power plant. The mill is estimated to cost more than $4,000,000 with machinery.

The Monolith Midwest Portland Cement Co., operated by the Monolith Portland Cement Co., Bartlett Building, Los Angeles, is said to be completing plans for a new cement mill on property secured several months ago about four miles from Laramie, Wyo. The plant is estimated to cost about $1,500,000 with machinery.

The Utica Mining Co., Balfour Building, San Francisco, has tentative plans for the construction of a new hydroelectric generating plant on Highland Creek in Tuolumne and Alpine Counties, for service at its properties. It will cost about $250,000 with transmission lines.

The Wade Engineering Co., Los Angeles, agent in California of the Lincoln Electric Co., Cleveland, has removed its northern office from 69 Webster Street, Oakland, Cal., to 533-39 Market Street, San Francisco.

The Rose City Iron Craft Shop, Macadam Road, Portland, Ore., has recently commenced the manufacture of interior ornamental and hand-wrought iron, including grates, fire screens, etc., under the management of H. B. Eckles and O. B. Dawson.

Canada

TORONTO, Sept 12.

A SOMEWHAT better inquiry for machine tools has developed during the past two weeks. Impetus has been given to sales as a result of displays at the Canadian National Exhibition, and dealers look for more active buying in the early future as a direct consequence of these exhibits. In addition to the steady demand for single tools, local machine tool interests report a general improvement in inquiries, many of which are of the kind that will ultimately turn into sales.

Industrial development in Canada has made considerable progress since the first of the year, and recent announcements are to the effect that many other plants will be erected of which several will represent investments of upward of $1,000,000. A good demand continues for equipment for mining developments in Ontario and Quebec.

Plans will be completed in about a month and construction work will then start on a 30 stall roundhouse, machine shop, yards, etc., for the Canadian National and Wabash railroads at Tecumseh, Ont. T. T. Irving, room 436 New Union Station, Toronto, is chief engineer.

The General Motors of Canada, Ltd., Oshawa, Ont., has awarded the contract for steel to the Standard Steel Construction Co., Welland, Ont., for a $200,000 body plant to be three stories, 55 x 300 ft. McGregor & McIntyre, Ltd., 1138 Shaw Street, Toronto, have the steel contract for the $50,000 wood drying kiln.

James A. Vance, 197 Light Street, has the general contract for a $15,000 factory for the Standard Tube Co., Woodstock, Ont., manufacturer of butted tubing, wire fencing, etc. The building will be one story, 90 x 138 ft., of concrete construction.

George Roe Barrie, Ont., is in the market for a portable sawmill and engine, the engine to be 10 x 10 ft., 150 lb. pressure.

S. E. Dinsmore & Co., Park Building, Windsor, Ont., have the general contract for a $160,000 factory for the U. S. Playing Card Co., Windsor, Ont. The building will be 90 x 422 ft., of brick and steel construction. The architects are Pennington & Boyde, 2 Bartlett building, associate architect, H. Hake, 2400 Gilbert Street, Cincinnati.

The Britnell Contracting Co., Toronto, have let subtrades in connection with a $100,000 addition to the plant of the Verity Plow Works, Brantford, Ont. It will be four stories and basement, 60 x 200 ft.

W. D. Beath & Son, Ltd., 394 Symmington Avenue, Toronto, Ont., manufacturer of electric hoists, barn door tracks, steel drums, etc. will start work soon on an addition to its plant.

Willys-Overand, Ltd., West Toronto, Ont., will start work immediately on an addition to its plant on Weston Road to cost $200,000. Machinery and tools to be installed will cost $100,000. T. A. Russell is president.

Western Canada

The Municipal Council, Burnaby, B. C., proposes to spend $200,000 on a waterworks plant. James Grey is chairman of the water committee. David Johnston is municipal engineer.

The Alberta Sugar Co., which is operating a plant at Raymond, Alta., is reported to have selected a site at Hollsprings, for the erection of a second plant.

The Alberni Pacific Lumber Co., Ltd., Port Alberni, B. C., plans the construction of a local light and power plant to cost $80,000.

Plans are being prepared by Fraser, Frew & Dryer, engineers, 448 Seymour Street, Vancouver, B. C., for a hydroelectric plant on the Alberni River, for the city of Port Alberni, B. C., to cost $80,000.

C. D. Howe & Co., elevator designers, Port Arthur, Ont., have been appointed to supervise the construction of the grain elevator at Ogden Point, Victoria, B. C. for the Panama Pacific Grain Terminals, Ltd. Preliminary plans have been prepared by the Metcalfe Co., and detail designs are now under way. Smith Brothers & Wilson have the general contract for the elevator which will cost $750,000.

The plant of the Machinery Manufacturers, Ltd., Factoria, Sask., was recently destroyed by fire. It is understood that the owners will rebuild.

Foreign

THE Municipal Council, Johannesburg, South Africa, has asked authority from the Department of Administration for the construction of a new electric light and power plant for city service, supplementing a 10,000-kw. electric generating station now in progress, to cost close to $1,000,000 with transmission lines, etc., scheduled for completion in about 60 days. Work has also begun on a new municipal gas works to cost approximately $1,400,000 with equipment.

The Argentine State Railways, Buenos Aires, have been authorized by the Ministry of Public Works to ask bids for the construction of new lines from Cordova to La Puerta, Metan to Barranqueras, and Formosa to Embarcacion, and call will be issued at an early date.

The City Council, Cali, Colombia, is planning for extensions and improvements in the municipal waterworks, to include the installation of pumping and power equipment, and other machinery. A portion of a bond issue of $2,000,000, recently sold, will be used for the work.

The Chiriqui Land Co., Panama City, Panama, has recently secured approval from the local Government for the construction of several railroad branch lines in the Province of Chiriqui, for operation of rolling stock over the Concepcion-Puerto Armuellas branch, and for other expansion in the Tonosi and Chiriqui concessions in the Pacific Coast district, including mechanical facilities for the handling of coffee and other products. According to the agreement, the company will invest $5,000,000 in the expansion and betterment programs.

The Bureau of Yards and Docks, Navy Department, Washington, is asking bids (no closing date announced) for refrigerating equipment for the naval submarine base at Pearl Harbor, Hawaii, including motor-driven air compressors, condenser, motor-driven brine pumps, brine cooler, liquid receiver, scale and oil traps, and complete auxiliary equipment; also bids (no closing date announced) for power house equipment for the same location, including portable fire-box type boilers, smoke flue, fuel oil pumping and heating equipment, oil burners, soot blowers, motor-driven centrifugal hot-well pump, boiler feed pumps, feed water heater, and complete accessories, specifications 5482 and 5481, respectively.

The Metropolitan Water District Board, Manila, P. I., has authorized plans for a new filtration system at the city waterworks for water purification throughout the district. The entire project will cost about $750,000, with machinery.

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